

E-SERVICE USABILITY AND CITIZENS EXPECTATION – A STUDY ON BANGLADESH E-GOVERNMENT SERVICE

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Abstract

In twentieth century we have witnessed an extensive growth of internet based services in our every sphere of life. The use of information technology has been a core element using by the government as a communication way to its citizen. E-services delivery is present in developing countries but the erudition is still in immaturity level. Most local governments only provide published information and downloadable forms. Most local government sites provide only one way communications. All are still at the basic level of publishing information online. Before implementing and developing any e-services, the authorities should know the expectation to the service from the users and it is also important to know the usability of the e-service in order to develop it with more usability function so that the users will satisfy by using the service.

This study is designed to take descriptive look at whether three e-services of Bangladesh government are perceived usable by the citizens. The studies focused on the current usability level of the three e-services and also find out the citizens expectation from those services. The overall conclusion is about the usability level of the e-services, expectations from the citizens, and suggesting the usability criteria to make the e-service more usable.

Keywords: *e-service, Usability, e-government, usability criteria, g-Quality model,, communicative criteria*

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1 Introduction

1.1 Background

Information communication technologies (ICTs) have appreciably taken the most important parts in each sphere of our daily life in the last decades. It includes from travel industry to all over health industries, banking, shopping, business communication, social communication, communication between individual and governmental activities. “The e-service is a computer-based tool that can be used for 1) simply tasks and 2) make tasks possible to conduct. To simplify tasks means that tasks can be performed faster with less effort” (Cronholm, 2010). There are both e-services for e-commerce and e-services for e-government supporting private and public sector.

According to Morven McLean and Tawfik Jelassi,(2003), e-Government is a key instrument for modernization and reform as governments face the continuing pressure of increasing their performance and adapting to the pressure of the new information society. E-government means using expertise, technology, and partnerships to integrate government services for the public. E-Government, in general, has approached the task of providing services from an agency centric perspective. (E –Government Blueprint California Franchise Tax Board, Members of the Board, Kathleen Connell, Chair Dean Andal, Member B. Timothy Gage, September 2000).

The motivation behind the research is described in the section 1.2. Along with this investigation e-service quality dimensions will be provided from both e-service providers and customers perspectives. E-service is very gigantic field and the most dominant part is E-commerce and E-Government.

E-government facilitates to be provide relevant government information in electronic form to the citizens in a timely and effective manner with massive technological innovation; better service delivery to citizens; empowerment of the people through access to information without the bureaucracy; improved productivity and cost savings in doing business with suppliers and customers of government; and participation in public policy decision-making. E-Governance refers to how managers and supervisors utilize IT and Internet to execute their functions of supervising, planning, organizing, coordinating, and staffing effectively. Common applications of Government include online delivery of government information and services, computerized licensing and registration, web-based tender notification and procurement, web-enabled complaints submission, and online public comment for draft

legislation. E-Government aims to streamline relationships among government, business, and citizens through effective use of ICT.

E-government should be a one-stop Internet gateway to major government services. The current research has attempted to find out the difficulties of implementing e-governance in developing countries from the perspective of Bangladesh.

1.2 Statement of Problem

E-government is a broad conceptual topic where customers, citizens, the business community, government employees, and government agencies are included. The use of Internet for accessing the information, interacting with the respective authority in making decisions through e-services, which are provided by the local government are increasing day by day. Bangladesh is a developing country where the e-government is now on the initial stage and also it is growing gradually. E-Government provides many e-service/opportunities to improve the quality of service to the citizen. Citizens should be able to get service or information in 24 hours in a day and 7 days in a week. Government employees should be able to do their work as easily, efficiently and effectively as their counterparts in the commercial world. (Simplified delivery of services to citizens, 2002)

Bangladesh faces a variety of governance challenges like including corruption, public administrative melancholy, and lack of adequate transparency and accountability in the exercise of public decision making powers and the delivery of public services. These problems have prompted a growing interest in practical reform initiatives. E-Government holds significant potential as a tool to assist the Government of Bangladesh in achieving its governance reform objectives. The Government has undertaken a variety of information and communication technology (ICT) - related initiatives. Some of these are limited to basic computerization, while others involve the automation of sophisticated government processes and the online delivery of services to citizens and the business community. (BEI, 2004)

In this area, we are trying to find out the answers of the question about what are the most significant factors of e-services usability in the means of e-government as it is mainly delivered to the citizen via Internet. Our special focus would be on the e-service usability issues that affect the citizen's satisfaction whether they are perceived usable or not, and also we will try to understand the citizen's expectation from the e-government in order to develop

the existing e-services provided by the local government exploitable. Usability issues of e-services are a vital component for customer or citizens' satisfaction. So, we tried to identify these issues which satisfies the citizen while using those e-services and also help the decision makers of govt. and the developers of e-service so that they could add those criteria's such as a categorized collection of perceived usability problems and a description of the citizens expectation and satisfaction in the e-service to make them more usable for everybody.

In Bangladesh, cost of accessing government services and even information is very high. If we consider the cost of transportation to the top of the un-official service this cost also goes higher. While most of the government forms are free, access to those forms to somewhat difficult which require paying identified brokers waiting in front of the relevant offices in getting the forms. With this background government recently has taken several e-government services for ensuring easy access to government information and success. Despite being technically sound, most of the project couldn't achieve their desired success. Moreover, there is also no recognized IT cell/department in government agencies to supervise websites yet. Scenario also has been negative attempt to update existing websites with up-to-date information regularly. Almost every government agency website contains obsolete information, giving a negative impression of the country. Thus far, no website provides the facility to access or search in-depth information about a specific topic or official document. Bangladeshi-owned web portals and commercial websites--even personal websites--are far better than those of Bangladeshi ministries web portals. Thus, the aim of this study is to find out whether the e-service provided by the local government in Bangladesh is usable by the citizen from the perspective of usability. Therefore we assume that by using our suggested usability guideline the government should walk to develop the different websites for e-governance service in order to provide the satisfaction to the citizen that they can find it easily as the adult literacy rate in Bangladesh is fifty-one percent.

1.3 Research Questions

The aim of research question is to identify the e-services that are provided by the local government in Bangladesh are usable by the citizens and to suggest proper guidelines to be usable.

The main question is as follows:

- Are the e-services provided by the local government in Bangladesh perceived usable by the Citizens?

This overall question is subdivided into detailed questions as:

- 1) What are the expectations of the citizens?**
- 2) What design criteria have been used when designing the e-services?**
- 3) What design criteria should be added in order to increase the possibilities to satisfy the citizens' expectations?**

1.4 Research Purpose

Internet provides an opportunity for governments to offer services to their citizens via websites. For efficient communication and access to public information, government websites plays a vital role. “Despite the importance of government websites in government-citizen relationship, many government websites are seldom used, especially not by people with disabilities (Ivory & Chevalier, 2002)”. For example, Abanumy et al. (2005) show that 98 percent of e-Government websites worldwide are inaccessible by impaired users (Asiimwe, E, N and Lim, N., 2010). In Bangladesh almost every government agency website contains obsolete information, giving a negative impression of the country. Thus far, no website provides the facility to access or search in-depth information about a specific topic or official document. Bangladeshi-owned web portals and commercial websites--even personal and commercial websites are far better than those of Bangladeshi ministries web portals. Thus, the above research purpose will create an understanding that whether the e-service provided by the local government in Bangladesh is usable by the citizen from the perspective of usability.

1.5 Target Group

Our Primary Target group are the citizens of Bangladesh not in demographic criterion but as a whole for capturing e-governed services through which they can easily access the information from the local government by the provided e-services, as the cost of getting information about the government services is high.

The developers and the Government are our secondary target group. According to the research question 2 we will remind them what design criteria they have used while they

designed the e-services. According to question 3 they will know the design criteria's what should be added to increase the possibility to satisfy the citizens' expectations.

1.5 Delimitations

This study is clearly limited in its scale. It will be limited to investigating the current level of usability issues on local government websites to find out how the citizen are using this service and also what is their expectation in near future from those e-services. The study will focus on three local government e-services which are Tax, road transport authority and education. The study will not focus on e-commerce.

We chose these e-services because these e-services are most important and most of the citizen wants this e-service. In order to collect the data, we will focus on the individuals of Bangladesh. It will be more effective if we directly contact with the persons who are involved in providing the services, to find out which usability issues they were take into their consideration while implementing and developing the services. But due to distance and lack to available time we could not do that. The study will stay within the framework of government e-services, usability and interaction of the websites within government e-services. Therefore our study did not cover e-business and social media.

The collection of data was made just at one point of time, which limits the possibility to draw causal conclusions. The data that was used in this analysis are based on the survey questionnaire, and are thus self-reported. Further research is needed to identify other related factors that were overlooked by this study.

1.7 Author Responsibility

In our thesis as we are three authors, from the very beginning we have divided our task to carry out the research work. Except the introduction and conclusion chapter we have subdivided our tasks. Methodology and analysis is done by Parag Parial, whereas the other two authors MD. Mizanur Rahman and Lokman Hossain did the theoretical basis and empirical study respectively and together. Therefore Parag made the co-ordination in between these above mentioned two chapters to do the analysis. And last, conclusion is written by consensus.

2 Methodology

The aim of this chapter is to present and vindication of research methods used in this research proposal. We will present the procedure and describe how the data will be collected.

2.1 Research Perspective

In our thesis, we would like to create an understanding for some important usability principles that could be used to enhance the usability of some e-services provided by the local government of Bangladesh in the use situations. Therefore, the character of knowledge is primarily aimed towards comprehension. Positivism and hermeneutics are the two most used categories in scientific research perspective. According to our research objective, as comprehension knowledge will come out through sound interpretation, hermeneutics is the most relevant approach because it aims at interpreting and explaining meaningful concepts (Gilje & Grimen, 1992). Forster (2007) states "hermeneutics" is the theory of achieving and understanding of texts, utterances and so on.

The choice of research approach is not only dependent on researcher's epistemological position and pre knowledge, but should also influence by the research question we set out to illuminate (Yin, 1994). There are different ways to address the matter while conducting the research. This can be divided in to two main categories. First is Deductive versus inductive and secondly qualitative or quantitative.

It is clear from the research question that our research approach is mixed with qualitative and quantitative. As the deductive approach is based on theories followed by hypothesis, based on the theories we will observe the respondents and based on observation, logical conclusion can be drawn.

The qualitative and quantitative methods refer to the way to choose one to treat and analyzed the selected data. Induction is usually described as moving from the specific to the general, while deduction begins with the general and ends with the specific (Burney, 2008).

A quantitative approach can be characterized by selectivity and distance to the object, where as a qualitative approach is characterized by nearness to the object of research. The best research method depends on the study's research purpose and the accompanying research questions Yin (2003). There is one significant difference between these two approaches. In the quantitative approach, results are based on numbers and statistics that are presented in figures. In the qualitative approach, the focus lies on describing an event with the use of

words. Which approach to choose depends on the problem definition together with what kind of information is needed. According to Holme and Solvang (1997), the two approaches are used as per their suitability and also be used in combination.

The quantitative approach is also characterized by study of few variables on a large number of entities. To find answers to its research problem, this is normally done in a broad sense by using surveys with already set answering alternatives. Furthermore, this approach is considered especially useful when conducting a wide investigation that contains many units, stated by Holme and Solvang.

According to Yin, Characteristics of qualitative studies are that they are based largely on the researcher's own description, emotions and reactions. The qualitative approach also includes a great closeness to the respondents or to the source that the data is being collected from, Holme and Solvang. It is characterized by gathering abundant information and to investigate several variables from a few numbers of entities. To make use of the possibility to gather high quality data, the most common way to do this is with the use of case studies and interviews where no set answering alternatives are being offered, been described by Holme and Solvang.

We shall use the qualitative and partially quantitative research approach due to exploratory is the nature of problem.

2.2 Research Strategy

The aim of this section is about how we have planned for our research to collect and analyzed the data.

Research can be performed to serve different purposes. According to Yin (2003), the purpose of a given research is to state what is to be accomplished by conducting the same research and how the upcoming results can be used. All research purpose can be classified into one of three general category of research: exploratory, descriptive and explanatory. These categories differ significantly in terms of research purpose, research questions, the precision of the hypothesis that are formed, and the data collection methods are used. (Aaker et al, 1998)

Exploratory research is appropriate when a problem is difficult to structure and when there is uncertainty regarding what models to use, what characteristics and relations that are important. The research is designed to allow an investigator to just “Look around” with the respect to some phenomenon, with the aim being developed suggestive ideas. The purpose of an exploratory research is to gather as much information as possible about a specific subject

stated by Reynolds. It is further common to use many different sources to gather this information. Exploratory research is conducted into an issue or problem where there are few or no earlier studies to refer to. The focus is on gaining insights and familiarity for later investigation. The technique is suited best for information gathering exploratory research in interviews stated by Yin.

The objective of descriptive research is to provide a description of various phenomena's connected to individuals, situations or events that occur. The purpose might be to develop empirical generalizations. Once such generalization begin to appear, they are worth explaining, which might lead to theory development, stated by Reynolds. Here data is often quantitative and statistics applied. It is used to identify and obtain information on a particular problem or issue.

Depending on the type of research, there are advantages and disadvantages to all the research strategies and it's based on the following three conditions:

- The type of research question posed.
- The extent of control an investigator has over actual behavioral events.
- The degree of focus on contemporary, as opposed to historical, events.

The most important criterion for deciding what strategy to use is to look at the research questions/objectives (Davey 1991, Yin 1981).

According to (Yin, 1994) Survey Strategy becomes more relevant when our research question is about (what, how or which) and our behavioral control is not firm and we are interested on contemporary events. The following figure will illustrate a clear view of research strategy.

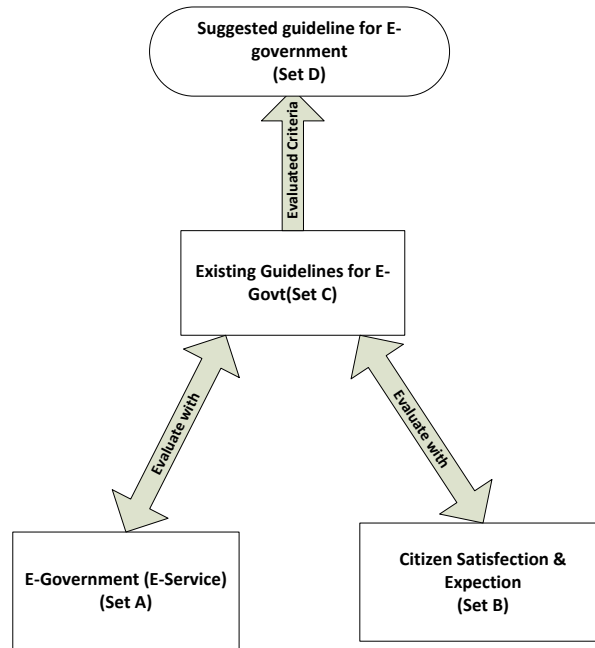


Fig 1: Research strategy

Figure: 1 Research Strategy

If we assume that SET A is existing e-services status which we collect from empirical study and SET B is the expectation of the citizen which we will collect from the survey.

After gathering all the information we will combine and evaluate with SET C which is existing guidelines for e-government model to identify the final outcome which we will suggest that these design criteria should be added (Set D) to make the IS or E-service more usable compared with before.

- The role of the theoretical study in our thesis is to create an indulgent on the concepts used to solve our research questions .i.e. Usability criteria or principal and models for e-government service which covers all our concepts used in our thesis.
- The role of empirical part in our thesis: In the main research question, we would like to figure out whether the e-service offered by the local Govt. are perceived usable by citizens or not. These usability criteria's are analyzed with the theoretical framework using different case study. To do an empirical study, we need to suggest a sampling for collecting data. The detailed part of the sampling has been explained in chapter 2.3.1.

According to Yin, the objective with an explanatory research is to analyze and identify cause-effect relationship, explaining what causes effects what. Reynolds (2004) states that, the goal with the explanatory study is to develop a theory that could be used to explain the empirical generalization developed in the descriptive stage. This provides a cycle of theory construction, theory testing and theory reformulations.

The research purpose and research question indicates that the study is exploratory. As the explanatory research is appropriate when a problem is difficult to structure and uncertainly to using the models, the investigator has to look around and as the purpose of an explanatory research is to gather as much as information as possible about a specific topic, exploratory research suit it best.

2.3 Data Collection Procedure

There are many different qualitative methods that can be used to collect data for this research. Some examples are:

- Text analysis,
- Deep interviews,
- Questionnaires
- Observations

In our theoretical study we have analyzed different text and literature from different international standard authors and in empirical study we have performed observation and interviews.

Theoretical Study: Text Analysis

According to Kuln, 1996 the result of previous research and accepted examples of scientific practice is the basis for further reseach. To perform a *text analysis* means reading written material and then analyzing it (Repstad, 1999). The advantage of this method is that it is possible to summarize the opinions of many authors in order to reach a standpoint that is relevant for the research. To create a scientific base for the problem area of our research we have used this method. The material is also used to describe the current status of e-services and ICT's success factors and to analyze those factors.

Empirical Study: Interviews

Interviews include conversations with one or more people in a user group. The aim of qualitative interviews (deep interviews) is to find out how the participants think and feel and it is here possible to find answers to several interesting questions, such as what kind of services they want from the local government, what is their expectation from the existing services or systems. An important advantage of interviews is that it is possible to go deeper into specific cognitive and affective aspects of the respondents' view of the problem area. I will therefore perform interviews. A disadvantage with the method is that it takes time and that it may be difficult to reach the most appropriate respondents. This problem can be reduced by preparations well ahead of the occasion. We have excluded this method in our study because it is quite impossible to get people over phone to take interviews being far from Bangladesh.

Questionnaires on the other hand have the advantage that it is possible to collect opinions from a large number of respondents with a relatively small effort. A questionnaire can be answered individually or in a group. The risks that are connected to this type of data collection method are fall outs and that different respondents may interpret the same question in highly different ways (Kylén, 1994) and the researcher may not be aware of that until after the questionnaires have been completed. If the survey is well prepared these risks may be reduced. In our study qualitative questionnaires takes an important part. Because these questionnaires or survey help us to reach people's to know their expectations. And thus it will quite impossible to reach the research goal without reaching the user's expectation level. A total of 300 questionnaires were sent to certain person of Bangladeshi community. From them only 20% replies were made available.

Empirical Study: Observation

An *observation* can be either active or passive (Repstad, 1999), and would mean that we should observe the interaction between customer's (citizen) and e-service. We have observed the existing e-services in Bangladesh from the perspective of IT systems functionality. It is however uncertain if that method could be used to effectively illuminate the research questions. It would in that case be necessary to perform a great number of observations and it is still uncertain in what way they might contribute to the research. We have performed three observations from the perspective of IT system functionality (See Fig-2, section 2.4) and categorizes the outcomes to g-quality model (see section 3.4.2.1 chapter 3)

In our research, we focused on text analysis, surveys and observation in order to collect the data. We send questionnaires through e-mails, which will comprise of both open ended and multiple choice questions. The survey provides the citizens' personal opinions as well their selection from the current e-Services in a generic way.

2.3.1 Sample Selection

Choosing a study sample is an important step in any research project since it is rarely practical, efficient or ethical to study whole populations. (Marshall, 1996)

Purposive sampling involves selection of informants based on an important characteristic under study, such as where they live (rural or urban), position in society (for example, community leader or ordinary householder), or specific cultural knowledge (for example, caretakers of children, farmers, traditional healers). (Cuanza Sul, 1994)

We shall select informants who have IT literacy and some basic knowledge of the issue. Our focused population will contain young generation people and some professionals. The age group will be from 21 to 40 because these age group people are more interested about new services (Shahzad, Shandu, 2007) development of existing services and have strong opinions about innovations. Our problem is related from Government to citizen and the routines of citizens, so it is necessary to ask them what they (citizen's) want or how they wanted to see those services from their perspective? That's why we are collecting data from existing sample e-services and also from sample population as they can represent the requirements of their same age group. This will help to abstract the required e- Services from the citizens.

For our thesis, we used multiple-respondent sampling because multiple respondents could add confidence to findings. The selected samples are the e-services provided by the three different ministries. We have selected this e-service because they are most successfully implemented e-services in Bangladesh (BEI, 2004). We have selected the e-services for ministry of education (<http://www.moedu.gov.bd/index.php>), national board of revenue (<http://www.nbr-bd.org/>) and Bangladesh road transport authority (<http://www.brta.gov.bd>).

2.4 Data Analysis

Herriot and Firestone (1983) stated in Yin (1994), "The evidence from multiple cases is often considered more compelling, and the overall study is therefore regarded as being more robust" (p. 45).

Although a description of the actual procedural details and nuances of every qualitative and quantitative data analysis strategy is well beyond the scope of a short paper, a general appreciation of the theoretical assumptions underlying some of the more common approaches can be helpful in understanding what a researcher is trying to say about how data were sorted, organized, conceptualized, refined, and interpreted. (Sally Thorne, 2006) Creswell (1998) has described a data analysis spiral that is, in our view, equally applicable to a wide variety of qualitative studies. Using this approach, you go through the data several times, taking the following steps: (Aaker et al, 1998)

“1. Organize the data, perhaps using index cards, manila folders, or a computer database.

You may also break down large bodies of text into smaller units, perhaps in the form of stories, sentences, or individual words. (ibid)

2. Peruse the entire data set several times to get a sense of what it contains as a whole. In the process, you should jot down a few memos (e.g., writing in the margins or using Post-It-Notes) that suggest possible categories or interpretations. (ibid)

3. Identify general categories or themes, and perhaps subcategories or sub themes as well, and then classify each piece of data accordingly. At this point, you should be getting a general sense of patterns --- a sense of what the data mean. (ibid)

4. Integrate and summarize the data for your readers. This step might include offering propositions or hypothesis that describes relationships among the categories. It might also involve packaging the data into an organizational scheme such as a table, figure, matrix, or hierarchical diagram. (ibid)”

In a qualitative study, the interpretation of the data will inevitably be influenced by the researcher’s biases and values to some extent, reflecting the notion of researcher as instrument. Nevertheless, we urge you to do as much as you can to minimize the extent to which your prior expectations and opinions enter into your final analysis. (ibid)

We can perceive from the above discussion that only good data collection cannot guarantee better representation of information and results. It is important to maintain the purity of collected information by interpreting, inspecting, maintaining its precision, and extracting it into information all should be done carefully. We shall use questionnaires for surveys and we shall try our best to present the collected expectations in their original way.

According to Seddon (2001), an e-service is a type of IT system. According to the **fig 1**(Research Strategy) in section 2.2 we observed the existing e-services (set A, as stated in section 2.2) functionality and then we categorize them according to the following **fig 2** on the perspective of IT systems functionality.

Then we collect and analyzed set B (citizens' expectation) according to the existing usability criteria. We used a checklist (appendix B) and compare the citizens' response with the checklist; before that we will categorize the answers of users/citizens for interpreting. This will provide strong basis for the readers to understand the actual desires from the citizens. This will be helpful for the reader to find solution in the light of collected data. The selection of usability criteria has been described later in chapter 3 section 3.7.1.

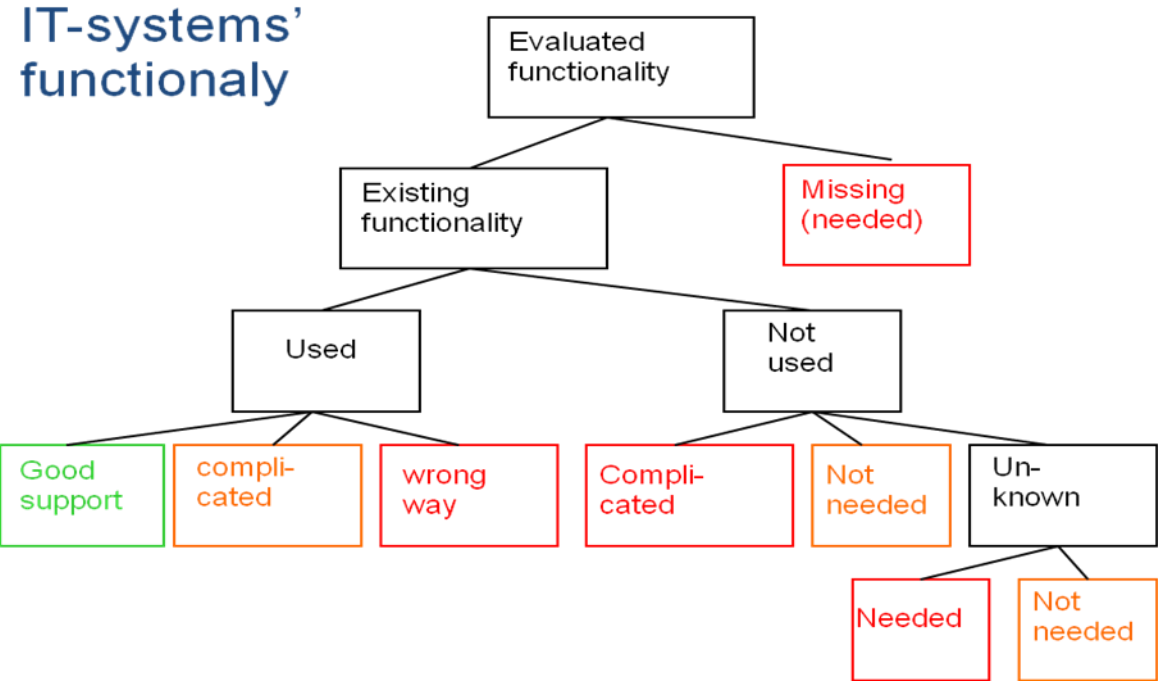


Figure 2: Evaluating IT systems functionality (“Cronholm, 2009”, lecture notes)

2.5 Validity and Reliability

“The credibility of qualitative research studies rests not just on the reliability of their data and methods but also on the validity of their findings.” (Silverman, 2001)

2.5.1 Validity

When we consider the validity of a research study we need to ask two basic questions. First, does the study have sufficient controls to ensure that the conclusions we draw are truly warranted by the data? And second, can we use what we have observed in the research situation to make generalizations about world beyond that specific situation? The answer to

these two questions addresses the issues of internal validity and external validity respectively. (Leedy, Ormrod, 2005)

2.5.2 Reliability

Reliability of a measurement instrument is the extent to which it yields consistent results when the characteristics being measured has not changed. (Leedy, Ormrod, 2005)

A researcher can enhance the reliability of a measurement instrument in several ways. First, the instrument should always be administered in a consistent fashion: In other words, there should be standardization in use of the instrument from one situation or person to next. Second, to the extent that subjective judgments are required, specific criteria should be established that dictate the kinds of judgments the researcher makes. And third, any research assistants who are using the instrument should be well trained so they can obtain similar results. (ibid)

In our case, validity and reliability will be achieved by focusing on key services and relevant expectations from citizens as results from the questionnaires. The validity will be ensured throughout research by using relevant literature and the questionnaire will be formulated to collect the expected information. Although in qualitative and partially quantitative research approaches it is hard to maintain the reliability but we shall try to attain it by managing the contents, sequence and physical layout of questionnaires.

2.6 Presentation Method and Reference Technique

The result of the study will be presented in written form. For readers to make it understand and for presentation easiness we also use some figures and some tables of information.

The technique used for references is the Harvard system. This system means that we indicate author surname and publication year within brackets when referring to a source in the text (Yin, 1994). When referring to more than one source they are placed in alphabetic order. Short quotations are indicated with situation marks in the text whereas longer quotations are indicated with tabulation and a smaller font.

3. Theoretical Basis

3.1 Subject areas relevant for Research

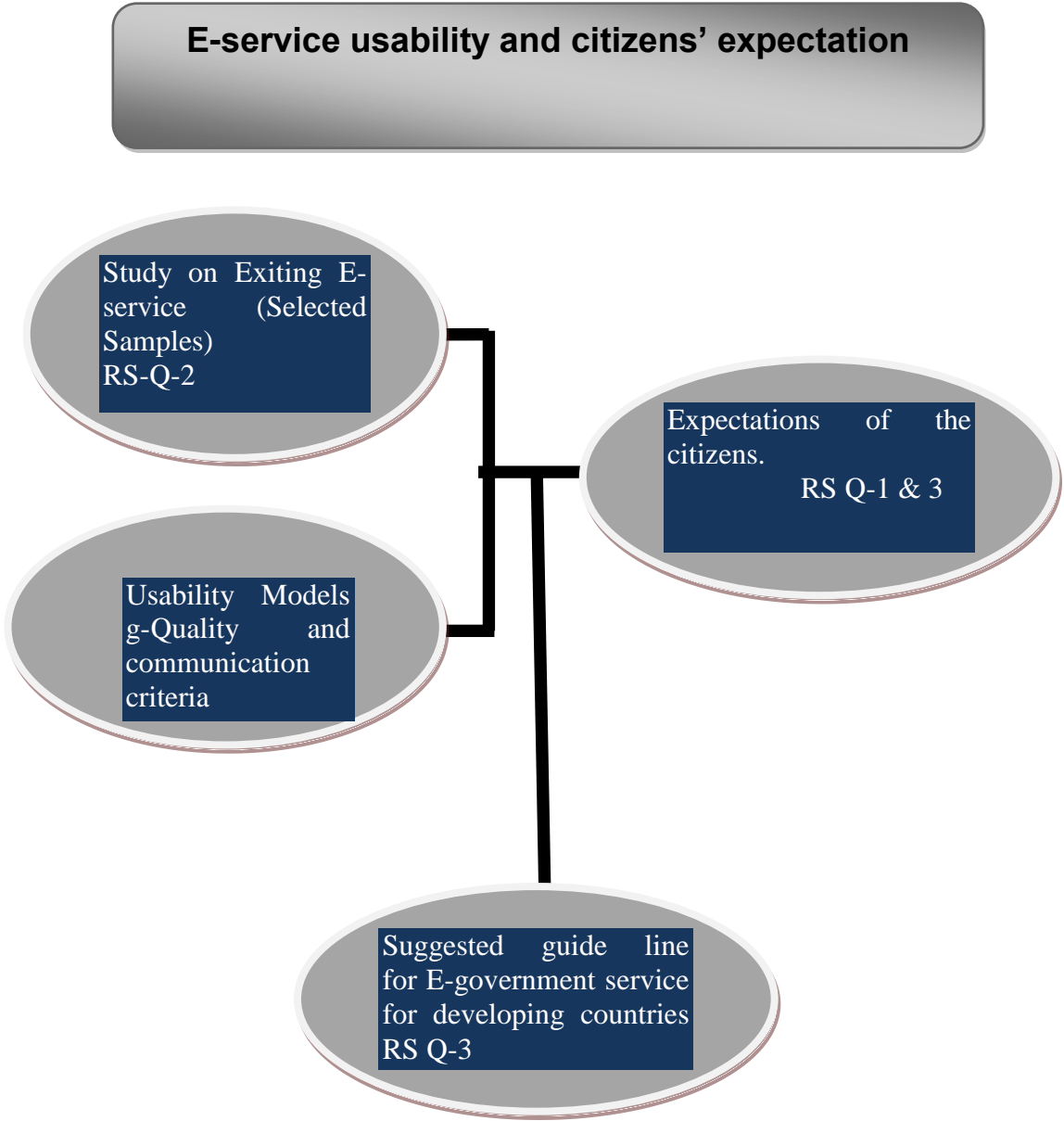


Figure 3: Relevant research area

3.2 Previous Research

Development of e-services is the rapidly growing area in e-government sector (Ancarini, 2005; Buckley 2003). “Web usability generally means that websites are clear, simple, consistent and easy for users to use (Cappel & Huang, 2007)”. According to Shneiderman, 1997, easiness to learn, security, efficiency, promptness and uniqueness should be maintained

in order to evaluate the interface usability of an e-service or web from the user perspective. Many researches have been conducted to evaluate the usability of e-services. Previous studies in the area of website evaluation lean to use a long list of measures to evaluate website usability. For example, 148 federal websites were examined by Stowers, 2002, in the US using 5 dimensions of 54 measures (Asiimwe, E, N and Lim, N. 2010). In another study, the portal websites of 84 cities were evaluated which are classified into five criteria: security and privacy, usability, content of websites, types of online services, and citizen participation from which 92 measures were found. Only cities with an online population of more than 100,000 were included in that study (Holzer & Kim, 2003; Melitski et al., 2005).

Abdulmohsen et al.; 2005; Heeks, 2002; Schuppan, 2009, states that only a limited studies have examined the issue of e-government in developing countries such as Africa to date. Heeks (2002) is one of the exceptions and discussed the development of e-government in Africa in relation to the specific economical and administrative characteristics of the continent (Asiimwe, E, N and Lim, N. 2010).

A recent research performed on the usability of government website of Uganda by (Asiimwe, E, N and Lim, N. 2010), in which they examined the government sites on the basis of design layout, navigation and legal policies and found that the average ratios of those sites are 46%. According to Powell 2000, the website usability based on the international standard organization (ISO) as “the extent to which a site can be used by a specified group of users to achieve particular goals with effectiveness, efficiency and satisfaction in a specified context of use”. The degree of website usability should be user and task dependent. It depends on how well the user should perform or navigate in a website to explore the situation that should be done efficiently and satisfyingly.

3.3 E-government

The term e-Government (e-Gov) emerged in the late 1990s, but the history of computing in government organizations can be traced back to the beginnings of computer history. A literature on “IT in government”, goes back at least to the 1970s. (Kraemer, et al, 1978, Danziger and Andersen, 2002) The e-Government was born out of the Internet boom. However, it is not limited to Internet use or publicly accessible systems for direct use by customers or citizens.(Gore, 1993; Salem,2003). E-Government refers to the use by

government agencies of information technologies that have the ability to transform relations with citizens, businesses, and other arms of government.’

There is always a debate on understanding the scope and meaning of e-government. E-government is a generic term for web-based services from agencies of local, state and federal governments. In e-government, the government uses information technology and particularly the Internet to support government operations, engage citizens, and provide government services. The interaction may be in the form of obtaining information, filings, or making payments and a host of other activities via the World Wide Web (Sharma & Gupta, 2003, Sharma, 2004, Sharma 2006). E-government has defined by other sources as follows:

World Bank (www.worldbank.org) definition (AOEMA report): “E-Government refers to the use by government agencies of information technologies (such as Wide Area Networks, the Internet, and mobile computing) that have the ability to transform relations with citizens, businesses, and other arms of government. These technologies can serve a variety of different ends: better delivery of government services to citizens, improved interactions with business and industry, citizen empowerment through access to information, or more efficient government management. The resulting benefits can be less corruption, increased transparency, greater convenience, revenue growth, and/or cost reductions.”

United Nations (www.unpan.org) definition (AOEMA report): “E-government is defined as utilizing the Internet and the world-wide-web for delivering government information and services to citizens.”

Definition of the Working Group on E-government in the Developing World (www.pacificcouncil.org): E-government is the use of information and communication technologies (ICTs) to promote more efficient and effective government, facilitate more accessible government services, allow greater public access to information, and make government more accountable to citizens. E-government might involve delivering services via the Internet, telephone, community centers (self-service or facilitated by others), wireless devices or other communications systems.”

At the third Annual E-government Conference held in Lisbon during May 2002, the term ‘e-government’ was used in the following way: “E-government is the application of Information and Communication Technology by government and public sector agencies, and is transforming the way governments interact with their citizens. It uses promises to enhance the effectiveness and efficiency of government and radically alter its relationship with the public. Improvements in communication and technology are playing a vital role in raising the

living standards and empowering people to understand and gain access to all the initiatives and support systems that are available to them”.

Though the definition from different sources may vary widely, but the things are common in general in the way that it involves to improve the delivery of govt. services to citizen, business or other government agencies smoothly by using information technology, specially the Internet. However, currently, many e-government initiatives focus on e-commerce models for implementing new IT initiatives such as developing new ways of providing fee-for-service applications over the Internet (Holmes, 2001). Norris (2003) argues that e-government has succeeded in facilitating information and service provision, not citizen engagement.

There are three broad areas that are usually used in E-government. They are: government to citizens (G2C) relationship; the government to businesses (G2B); and the government to government (G2G). Basically the aims of E-government are to improve the accessibility, interactions between citizens, businesses and the government with quality service and in a convenient way; and to improve the speed and quality of information flow. The major objective of E- government is to serve its citizens more efficiently while lowering operating.

Today, public servants are encouraged and trained to be familiar with the tools and languages of ICT. ICT offers three information processes to promote governance:

- Automation: replacing current human-executed processes, which involve accepting, storing, processing, outputting or transmitting information (i.e., the automation of existing clerical functions).
- Informatization: supporting current human-executed information processes, namely supporting current processes of decision-making, communication, and decision implementation.
- Transformation: creating new ICT-executed information processes or supporting new human-executed information processes. For example, creating new methods of public service delivery. (Heeks)

For most United Nations member states, electronic service delivery, or e-government, remains a new and challenging medium. E-government encompasses many applications and incorporates virtually all ICT platforms. The Internet is the most widely recognized and identifiable component driving e-government. Governments are rapidly embracing the Internet to facilitate an increasing number of transactions, including procurement, tax collection, vehicle registration, and the issuance of permits and licenses. The Internet may well become an ideal medium for many public sector transactions because they are relatively

straightforward and require neither physical examination of products nor personal contact (Stanford Borins). Information technology also can empower rural people by providing them with both accesses to information and the tools for analyzing it. In agriculture, for example, systems technologies can help farmers in the area of crop management by providing information concerning planting date selection, water use and management, pest and disease control, and harvest management. The Land Information System, to cite a specific example, provides information concerning markets, food pricing, imports and exports, tariffs and quotas, underproduction and overproduction as well as information on soil, hydrology, and rainfall that support planning activities at various administrative levels (Kumar and Chadha, 2002) Availability of such information in a timely manner would assist farmers in making decisions that would ensure increases in productivity.

Use of ICT by the government in the education, health care, and environment sectors can also prove beneficial. In education, it can increase literacy rates significantly. Web-based education and e-learning have emerged as handy tools for distance learning. Both video and computer conferencing have made it possible for students in remote rural regions to have access to teachers anywhere in the world. The Digital Revolution also has had a major impact on the delivery of health care. It allows for an efficient exchange of information, such as patient's records and medical diagnosis, between health professionals, which improves the quality of health care. Government can use information technology applications for effective management and monitoring of environmental resources. This would enable authorities to take appropriate actions in case of emergencies. It would also prove helpful in such areas as air and water quality monitoring, pollution warning systems, public environmental information services, and environmental emergency management systems for floods, forest fires, and other natural disasters. (Ibid)

In sum, e-government is defined by inter-organizational relationships that promote policy coordination and implementation, and by the delivery of services on-line or through other electronic means to citizens. This includes:

- Developing citizen-centric programs
- Promoting and enhancing citizen participation
- Perfecting on-line service delivery through analysis and evaluation, measuring efficiency, and benchmarking against other forms of service delivery.
- Country indexing (performance measurement benchmarking): portal analysis; website analysis (UNDPEPA/ASPA, Benchmarking E-government)

3.4 E-Government Components

E-government incorporates four key dimensions, which reflect the functions of government itself: Sharon (2002) four e-Government components are

E-Democracy -- the use of electronic communications to increase citizen participation in the public decision-making process. E-democracy uses the power of the Internet to bring people closer to their government and enhance the democratic process. E-democracy helps by breaking down the barriers between citizens and government. By using online processing facilities governments aim to help its citizens to better understand their government process and systems, and to encourage citizens to participate in government, keep citizens informed, provide platforms for communication, to have access to the required information, and provide better accountability of government.

Gabardi (2001) states that e-democracy can be something as effortless as electronic access by citizens to governmental information. E-democracy can also be more intricate and can involve more interaction between citizens and government including:

- The capability of citizens to reach and interact with governmental officials (e.g., via email or other electronic means)
- On line review of and comment on government proposals (budgets, land use plans, etc.) and regulations
- Electronic citizen participation in governmental actions and decisions through such things as on line forums
- On line consultations and electronic town hall meetings; on line referenda;
- On line registration; e-voting

Eiffert and Puschel (2004) said that, governments at all levels including national, local and international levels are interested in following and implementing e-government as it has the capability to efficiently administer government business. But have sometimes given secondary priority to e-democracy. Therefore governments are now taking a more in-depth interest in the initiatives of e-democracy. Same as citizens themselves are taking interest in the effective usage the internet and technology keep pacing with the developed countries.

According to the project report by Rose (2005), e-democracy reduces the investment of government. Citizens can contact government officials easily by using internet, mails and text messages as an efficient way to contact politicians.

The communication process, of using ICT and web-technology has been improved and simplified. It works independently and does not require synchronization in communication. Citizens, especially young people, and politicians are the targeted groups for e-democracy.

Torres (2005) states that, e-democracy facilitates the contact between citizens and members of government by using the citizens' suggestions boxes or complaints about public services. Hence it shows that e-democracy provides the way for the government to easily inform the citizens and reduce the gaps which exist between citizens and government. This provides a better opportunity for government to offer better services for its citizens.

E-Commerce -- the electronic exchange of money for goods and services such as citizens paying taxes and utility bills, renewing vehicle registrations, and paying for recreation programs, or government buying supplies and auctioning surplus equipment.

E-Management -- the use of information technology to improve the management of Government, from streamlining business processes to maintaining electronic records, to improving the flow and integration of information for smooth operation for business.

Another component of E-government is **E-service**. We have described E-service briefly in the section 3.4 labeled as "Usability and E-service".

3.5 E-government in Public Sector

E-service can simply be defined as the provision of services in electronic form to customers (Saanen and Boyer, 1999, 2002). This definition is based mostly on the assumption of private sector. For better understanding of the definition of e-services in the perspective of the public sector we must have to look at the definition of e-government.

Lieber (2000) defines, e-government as: implementing cost-effective models for citizens, industry, federal employees, and other stakeholders to conduct business transactions online. This concept integrates strategy, process, organization and technology.

While Turban (2002) suggests that, e-government uses applications of various technologies: that provide citizens with more convenient access to government information and services; and to provide delivery of public services to citizens, business partners and suppliers, and those working in the government sector.

So a definition of e-public service could be defined to encompass the following:

E-service as defined by Boyer (2002) “The e-service encounter is the initial landing on the home page until the requested service has been completed or the final product has been delivered and is fit for use.”.

E-government: provision of government information to citizens, the facilitation of active participation and consultation for citizens. e.g. electronic voting etc.

E-public service: delivery of public services to citizens, business partners and suppliers, and those working in the government sector by electronic media including information, communication, interaction and contracting, and transaction.

3.6 E-service & USABILITY

3.6.1 E-Services

E-Service is a fast growing field that is getting lots of attention and importance (Bruecher and Scholl 2004), Citizens demand that government should provide e-services with high quality, quantity, and availability 24/7. For the deployment of e-services, governments are developing information systems and electronic services that have the capacity to fulfill the demands of its citizens.

Cook (2002) stated that, a number of studies have been conducted on e-services and citizens desires and needs. The conclusions of the studies state that most government agencies do not provide adequately the e-services the citizen needs or desires but government agencies at all levels have made significant strides in the establishment of e-services by improving staffing, financing, and technology and to make better and more significant improvements in the delivery of e-services to its citizens.

“E-service, business concept developed by Hewlett Packard (HP), is the idea that the World Wide Web is moving beyond e-business and e-commerce into a new phase where many business services can be provided for a business or consumer using the web.”
(<http://searchcio.techtarget.com>)

An e-service is a web based software or an information system which is part of the Government web system whose aim is to automate support or partly automate administrative process. This process can be triggered by a request from a citizen. (www.emacao.gov.mo)

Boyer (2002) stated that "the e-service encounter is the initial landing on the home page until the requested service has been completed or the final product has been delivered and is fit for use."

Jaeger and Thompson (2004) argued, the issues of the digital divide, which should be carefully examined theoretically as well as on the practical level for e-government usage by citizens. The primarily issue of the digital divide among the citizen users are their economic gap, cultural difference, and geographical lapse. These were some of the reasons identified why some citizens have difficulties and do not use e-government information and services. The success and acceptance of e-government depends on the citizens' willingness to utilize the services provided.

Bangladesh is a developing country and its e-services are just moved from its initial stage to developing stage because still the people's are Bangladesh are not aware of using Internet. Only some people, if we put them in exclusive group for example officials, students and some other literate persons can use Internet. Therefore accessibility, accountability, and transparency are three most important parts of e-service, they are still not achieved due to unavailability of internet in rural areas, lacking in ICT's infrastructure. The national site not provides only information to citizens but also provides some necessary forms to download but they are not in an interactive manner to citizen.

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3.6.2 e-Services Types

In e-Government the local government provides e-Services to citizens, like any e-business, are generally divided into the following categories:

Informational: Gartner notes that "the vast majority of governments" has developed a Web presence and has moved on to further development. (www.sun.com)

This is the first phase and includes the provision of information alone. The quality, usability and currency of the content determine the value of this phase of e-Government. This is the least complex of all the phases. (www.unpal.un.org)

Interactive: In this phase, e-Government provides some degree of online interaction. For instance, citizens can enter complaints or job applications online. This phase does not include secure transactions such as financial or other transactions that require a high degree of authorization and audit. (ibid)

Transactional: Enabling e-citizens to complete tasks online is the major characteristic of this critical third phase (Gartner). It provides secure transactions with high level of authorization. Citizens can now apply online for passports, NICs (National ID Cards) and make payments online. This requires a high degree of security and basic infrastructure allowing for secure transactions. (Towards Access for Opportunity)

Collaborative: In this phase citizens and businesses collaborate with the government on processes, projects, etc. This is especially important for businesses working together with the government on projects, for public-private partnerships, NGOs, citizen forums, etc. This phase requires a collaboration infrastructure, which brings together suppliers, consumers and the government in a network with the object of increasing value creation. (ibid)

3.6.3 USABILITY (SET C)

“**Usability** is the measure of the quality of a user's experience when interacting with a product or system - whether a web site, software application, mobile technology, or any user-operated device.” (www.webnauts.net)

“Usability is a quality attribute that assesses how easy user interfaces are to use. The word "usability" also refers to methods for improving ease-of-use during the design process.” (http://www.useit.com/alertbox/20030825.html)

According to Usability Expert Jakob Nielsen:

On the Web, usability is a necessary condition for survival. If the homepage fails to clearly state a web site is difficult to use, people leave. If the homepage fails to clearly state what a company offers and what users can do on the site, people leave.

If users get lost on a web site, they leave. If a web site's information is hard to read or doesn't answer users' key questions, they leave. There's no such thing as a user reading a web site manual or otherwise spending much time trying to figure out an interface.

User's benefits from usability

With the help of usability users may get the following the benefits:

- They will be satisfied, not frustrated, with the web site or product;
- They will enjoy interacting with the web site or product;
- They will achieve their goals effectively and efficiently;
- They will cultivate confidence and trust in the product or web site.

If your users are satisfied, they will become loyal, and may even recommend your product or service to others.

Provider's benefits from usability

- As a provider, you may benefit from usability in many ways, including:
- Reduced development time and costs;
- Reduced support costs;
- Reduced user errors;
- Reduced training time and costs;
- Return on Investment.

Wood, F. et al 2003, has use usability testing, user feedback, usage data, and web and Internet performance as his evaluation criteria for a multidimensional web-based e-government. According to Wood, 2003, specific methods are appropriate for obtaining different types of information at different stages of the web site's life cycle. Among then Nielsen's usability heuristics evaluation method is broadly used, particularly in the initial phases of the project.

According to Garcia, Maciel, and Pinto (2005), there should be some objective method to evaluate the quality of e-gov. sites or service before proposing guidelines to design e-gov. services. There are lots of usability evaluation criteria or guideline for e-service. Among them we have choose Nielsen's heuristics evaluating method, and an extension of Nielsen's heuristics evaluating method proposed by A.C.B. Garcia, C. Maciel, and F.B. Pinto, which they called **g-Quality** method for evaluating e-gov. sites or e-services. This method was applied to 127 Brazilian e-gov. sites and found more problems compared to applying Nielsen's heuristics model.

Therefore, we have also used "Communication criteria for evaluation of public e-service" (Cronholm 2010). The suggested criteria are derived from a communication perspective.

3.6.4 g-Quality Model

“To access the electronic government domain on the web, bearing in mind that the citizen should be the main focus. It was realize that the heuristics could be grouped under five evaluation criteria, namely:

- Cognitive Effort: Use of individual attention to understand and learn a task. By minimizing the cognitive effort, users will perform tasks more intuitively, thus reaching their objectives more effectively;
- Tolerance: Citizen’s motivation and patience in awaiting, understanding and performing tasks according to site responses;
- Reach: Possibility of reaching a greater number of citizens, whatever the technical features of the user’s equipment or their special physical or cognitive needs;
- Physical Effort: Easiness to use the site, as a result of data reuse;
- Trust: Demonstrating reliability and credibility, guaranteeing security in the information exchange and in the site navigation.” (Wood, F. et al 2003)

According to Garcia, Maciel, and Pinto (2005), Nielsen’s usability heuristics, they covered up any further explanation (Nielsen, 2000). The last five are the extension required to evaluate e-govt. sites as follows:

- *Visibility of system status*: the system should always keep users informed about what is going on, through appropriate feedback within reasonable time.
- *Match between system and the real world*: the system should speak the user’s language. Follow real-world conventions, making information appear in a natural and logical order.
- *User control and freedom*: users often choose system functions by mistake and will need a clearly marked “emergency exit” to leave the unwanted state without having to go through an extended dialogue.
- *Consistency and standards*: users should not have to wonder whether different words, situations, or actions mean the same thing.
- *Error prevention*: even better than good error messages is a careful design which prevents a problem from occurring in the first place.
- *Recognition rather than recall*: make objects, actions and options visible. The user should not have to remember information from one part of the dialogue to another.

- *Flexibility and efficiency of use*: Accelerators may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users.
- *Aesthetics and minimalist design*: dialogues should not contain information which is irrelevant or rarely needed.
- *Help users recognize, diagnose, and recover from errors*: error messages should be expressed in plain language, precisely indicate the problem, and constructively suggest a solution.
- *Help and documentation*: even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation.
- *Accessibility* – e-gov site should include all citizens. Consequently, the site should attend people with special needs.
- *Interoperability* – e-gov site should be able to exchange information and services as in actual government bureau. In order to achieve interoperability, at least communication protocols should be defined, but it is recommended standards.
- *Security and privacy* – Government site should be protected against hackers because people will rely on the information. Additionally, citizens' information should be protected when sent to e-gov sites.
- *Information truth and precision* – Information must be true and precise since it will influence citizens' life. It is the government responsibility to maintain its sites updates and corrected.
- *Service Agility* – Time response to citizens' requests is fundamental to create trust; i.e. communication is a two-way road.
- *Transparency* – The governments must make available to the public all pertinent information, such as, public expenditures, so as to allow a clear view of governmental operations.

The following figure shows that five criteria are mapped into 16 heuristics

COMPONENTS		CRITERIA				
		Cognitive Effort	Tolerance	Reach	Physical Effort	Trust
NIELSEN	Status Visibility	●	●			
	Site Compatibility with Real Life	●		●		
	User Control and Freedom	●	●			
	Consistency and Patterns	●		●		
	Error Preventions	●				●
	Recognition Instead of Remembrance	●		●		
	Usage Flexibility and Efficiency	●			●	
	Aesthetics/Minimalist Design	●	●			
	Error Prevention and Diagnosis	●	●		●	
	Help and Documentation	●	●	●		
NEW	Accessibility	●		●		
	Interoperability			●	●	
	Security and Privacy					●
	Information Reliability					●
	Service Agility		●			●
	Transparency		●			●

Figure 4: e-gov. evaluation criteria and heuristic rules mapping (A.C.B. Garcia, C. Maciel, and F.B. Pinto)

3.6.5 Communication criteria for evaluation of public e-service

According to Cronholm (2010), e-service can be formed from communicative view of IT systems, because the role of an e-service is to communicate between the citizens and the authority.

As pictured in figure 3, the communication criteria are consisting of three types of qualities that should be supported by the e-service. They are –

Interaction quality: Interaction is something that takes place between a user and the e-service.

Communication quality: The communication takes place between two users (an authority administrator and a citizen (or a representative for a company)). The communication is mediated by the e-service. “The communication process is supported by the interaction quality” (Röstlinger & Cronholm, 2009).

Goal quality: The communication quality supports the fulfillment of the goals of the authority and the goals of the citizens.

The relationship between goals, communication and interaction can be viewed as a goal means hierarchy.

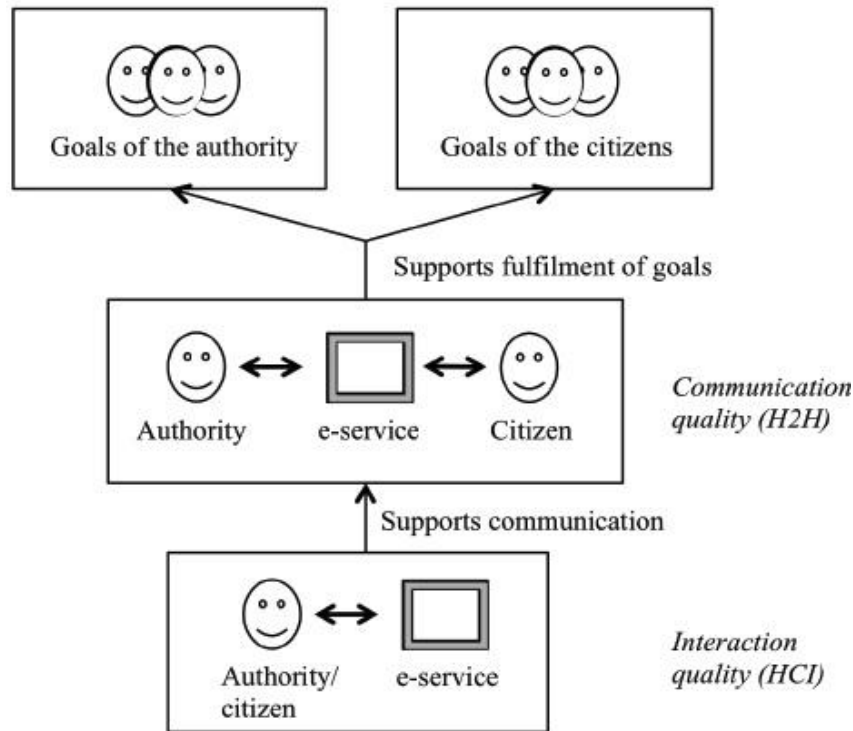


Figure 5: Communication criteria for evaluation of public e-service (Cronholm 2010)

Examples of typical interaction criteria are: “Visibility of system status”, “Enable frequent users to use shortcuts”, “Match between system and the real world” and “Permit easy reversal of actions”. Examples of typical communication criteria are: “interoperability”, and “Satisfying communication needs”.

3.7 E-Citizen Expectation (Burger, 2005)

The following discussion concludes as an endeavor between the Government and the citizens. Government can set or consults these requirements as goal for their services measurement form e-government similarly these requirements can be considered also from the citizens. These standard requirements will be useful for both the Government and Citizen as both can measure their expectations: “

i. Choice of Channel.

As a citizen I can choose for myself in which way to interact with government. Government ensures multi channel service delivery, i.e. the availability of all communication channels: counter, letter, phone, e-mail, and internet.

- ii. **Transparent Public Sector.** As a citizen I know where to apply for official information and public services. Government guaranties one-stop-shop service delivery and acts as one seamless entity with no wrong doors.*
- iii. **Overview of Rights and Duties.** As a citizen I know which services I am entitled to under which conditions. Government ensures that my rights and duties are at all times transparent.*
- iv. **Personalized Information.** As a citizen I am entitled to information that is complete, up to date and consistent. Government supplies appropriate information tailored to my needs.*
- v. **Convenient Services.** As a citizen I can choose to provide personal data once and to be served in a proactive way. Government makes clear what records it keeps about me and does not use data without my consent. (ibid)*
- vi. **Comprehensive Procedures.** As a citizen I can easily get to know how government works and monitor progress. Government keeps me informed of procedures I am involved in by way of tracking and tracing.*
- vii. **Trust and Reliability.** As a citizen I presume government to be electronically competent. Government guarantees secure identity management and reliable storage of electronic documents.*
- viii. **Considerate Administration.** As a citizen I can file ideas for improvement and lodge complaints. Government compensates for mistakes and uses feedback information to improve its products and procedures.*
- ix. **Accountability and Benchmarking.** As a citizen I am able to compare, check and measure government outcome. Government actively supplies benchmark information about its performance.*
- x. **Involvement and Empowerment.** As a citizen I am invited to participate in decision-making and to promote my interests. Government supports empowerment and ensures that the necessary information and instruments are available.”*

3.8 Current status ICT in Bangladesh

E-government is in its initial state still now in Bangladesh. An ICT taskforce has been formed and ministry of planning has already lunched a support to ICT taskforce (SICT) in order to ensure access to information by every citizen to facilitate empowerment of people and enhanced democratic values and norms for sustainable economic development.

Bangladesh is a part of global village. The environment of this global village is changing, shaping and altering at internet speed. To stay competitive in the global market, it has become imperative for Bangladesh to keep pace with this speed by implementing e-government. In Bangladesh, e-government is just evolving, but the ball has been set rolling for an internet revolution. E-government is no longer a luxury but a reality. Now, it is estimated that more than 300 ISP's (Internet service Provider) are working in our country and there are near about 1 million internet users in the country. So, there is a vast chance for the expansion of e-government in Bangladesh.

With 45.3% functional literacy rate (BANBEIS, 2010) and majority of the population based in rural areas, the people of Bangladesh predominantly rely on traditional and relatively low-tech ICT options to have access to information. The size of user base for public AM radio and terrestrial TV in Bangladesh is comparable to its South Asian neighbors (except Nepal, which enjoys an exceptionally high radio listenership rate). Figure 1 shows the comparative data for literacy, telephone and internet density and other traditional access among four South Asian countries.

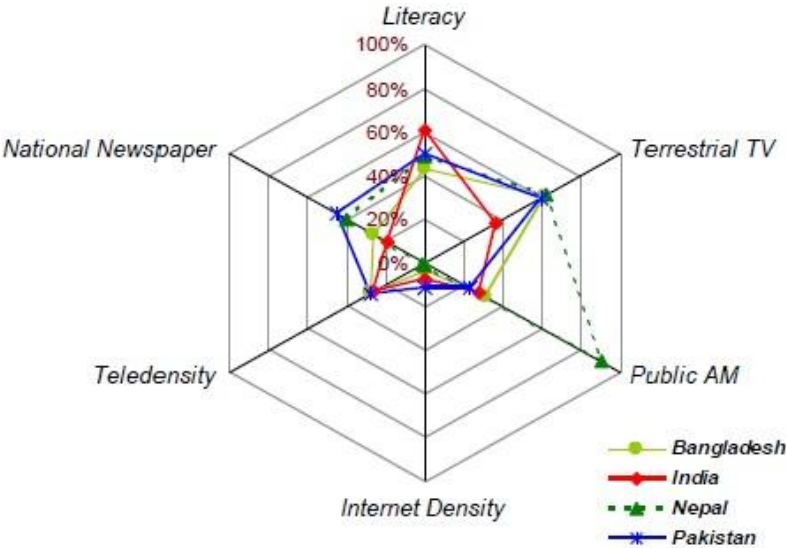


Figure 6: COMPARATIVE DATA FOR LITERACY, TELEPHONE AND INTERNET DENSITY AMONG INDIA, NEPAL,

Several government offices have begun to undertake e-Government projects, ranging from basic computerization to sophisticated information systems that aim to automate processes and to ensure more efficient service delivery. These projects have met various levels of

success. While it may be too early to reach definitive conclusions regarding the final outcome and impact of these e-Government initiatives, important lessons can be drawn from experience to date.

In the recent ICT Development Index released by the International Telecommunication Union (ITU), Bangladesh is ranked is still not encouraging yet. Out of 154 countries, rank of Bangladesh is 138, only above Nepal (ITU, 2010). On the other hand, public access to ICTs with and without Internet connectivity during last one decade (2001-2010) mainly through private and not-profit initiative played an important role in reducing digital divide, although it was not adequate proportionate to the needs. In chapter three we have briefly describe on the current e-government service.

Ministry of Science and Information & Communication Technology (www.mosict.gov.bd) has prepared a project "Electronic Governance in Bangladesh: Development of Government Administration Information System" for establishing e-Governance system in 38 Ministries and Divisions.

3.8.1 Support to ICT Task Force (SICT) project

A 890 million Taka Project entitled "Support to ICT Task Force"(www.sictgov.org) primarily for introducing e-Governance is being implemented (Islam 2005)by the Planning Commission under the Ministry of Planning. Initially 6 Divisional HQ, PM Office and some key ministries e.g. Health, Home Affairs, Land, Information, Labor, Expatriate Welfare, Foreign affairs and Planning have been chosen to implement some basic electronic services with recent steps. The purpose of this project is to establish a communication network, which will be highly efficient, reliable and fully secured:

Under the SICT program several ministries and government departments have undertaken major e-governance projects. These includes Dhaka passport office under the ministry of home affairs, the ministry of education ,the ministry of posts and telecommunication and the department of agricultural marketing under the ministry of agriculture ,the ministry of expatriate welfare and overseas employment. (BEI, 2004)

The government was considered aggressively to move into e-governance for providing all needed information to citizens and for efficient and transparent services and to create an information environment and enhance the efficiency, effectiveness, dynamism in public agencies. As a result some of the government agencies have already launched their websites.

The official website of the Government of Bangladesh, www.bangladeshgov.org, currently contains links to President's Office, Prime Minister's Office, 8 ministries and 59 agencies. Some of these contain important documents like Budget, Census Data, Customs and Income Tax regulations, etc. Almost all Ministries are currently using e-mail facilities.

State Minister for Science and ICT Yeafesh Osman told the news agency that a project styled `Development of National ICT Infra-Network for Bangladesh Government (Bangla.gov.net) has been taken up. Under the scheme, a central data centre (CDC) will be set up and be connected to offices of deputy commissioners (DCs), Upazila Nirbahi Officers (UNOs) in all 64 districts, according to the science and ICT ministry. He said district level ICT centre will be set up during 2010-11 and at upazila level in the period of 2011-12 (www.thedailystar.net) Only developments of e-government last couple of years in Bangladesh. Recently the Bangladesh government has taken initiatives to leverage ICT Under the banner of Digital Bangladesh.

In its election manifesto, the incumbent Awami League government declared a desire to make Bangladesh digital by 2021. The Digital Bangladesh (DB) vision is being developed by the UNDP funded Access to Information (A2I) Programmed and is based in the Prime Minister's Office. The two key pillars of the DB vision -- connecting citizens and reaching pro-poor services to the citizens' doorstep -- if successfully implemented will exemplify innovative and pluralist service delivery models that cater to the poor. (www.thedailystar.net)

According to UN Public Administration News, UNDP funded Access to Information (A2I) Program provides additional hardware and digital content. The UISC model is, however, not new in Bangladesh. D.Net's Pallitathya Kendra (PK), i.e. village information center, has a similar model that has been implemented in selected rural areas.

3.8.2 ICT Infrastructure: Telecommunications

The following table shows the current status of ICT Infrastructure

Number of Telephones (land-lines)	1 million
Number of Cellular subscriber	12 million
Telephone Density (landline and cellular combined)	8%
Paging & Radio Trunk Subscribers	7000
Telex Subscribers	16000
International Trunk Exchange	3

Total International Circuits	3700
International Internet Backbone	10MB
VSAT Provider	31
VSAT user	93
Number of ISPs	221
Fiber optic Cable Network (under Railway)	1800km
Satellite Earth Station	4
Internet user	.3million

TABLE 1: TELECOMMUNICATION STATUS TABLE

3.8.3 ICT Incubation Centre

In order to encourage startup companies in software/ITES development and export, the government has set up an ICT Incubation Centre at a rented space of 68,000 sq. ft. in the heart of Dhaka City. At present, about 48 IT/software related companies have set up operations in this facility. The facility has been provided with 24-hour power supply and internet gateway facility from the Development of Infrastructure for IT Applications Project of BCC. ICT service industry which have bright prospect in Bangladesh includes data entry/data transcription services (voice, video), cyber-cafe, cyber kiosks, public call-centre (PCOs), telemedicine, electronic-mail centers, web-site design and maintenance, e-commerce and other web-based applications, electronic-journalism, Tele-banking, e-banking, etc.

3.8.4 Hi-Tech Park

A High Tech Park with all modern infra-structural facilities is being planned at a cost of 2,522.5 million Taka (43.5 million USD), which will have in house software and ICT-enabled service industries, electronics and PCB related equipment and products, telecommunications, hardware assembly/component/VLSI design (Possibly manufacture also), optoelectronic equipment, bio-technology and related linkage industries, including a hi-tech University to provide technical support and for conducting R&D at the park facilities.

3.8.5 Bangladesh Bank automation of Internal Processes:

The Central Bank of Bangladesh is begun to computerize its functions ahead of most other government institutions. Today it is one of the most fully computerized public institutions in the country. The following processes have been automated: export receipts; import payments; invisible receipts; invisible payments; scheduled bank advances; scheduled bank deposits; scheduled bank bills; scheduled bank debits; co-operative bank advances; cooperative bank assets, liabilities; summary statements; central accounts of Bangladesh;

loans and grants; exchange rates; monetary survey; broad money survey; salary bill of employees of Bangladesh Bank; Bangladesh Bank employees' provident fund; press communiqué liquidity position; assets/liabilities; export form matching; wage earners' remittance; secret test key development of National Credit and Commerce Bank Ltd.; secret test key development of National Bank Ltd.; and secret test key development of EXIM Bank Ltd. Bangladesh Bank has also established a dynamic, information-rich website that contains information about important macro-economic indexes and other relevant financial information. The website is updated regularly. (Ministry of Information and Science & Communication Technology)

3.8.6 Making IT Available Across the Country:

Recently a step was taken to make IT Available across the Country. As Prime Minister Sheikh Hasina cut the digital ribbon launching information and service centers in 4501 unions with Helen Clerk, UNDP administrator and former Prime Minister New Zealand sharing the great moment from Kukri Mukri, Bangladesh has taken a stride. It has immense potentiality. The government has decided to launch online application for admission to Bachelor of Medicine and Bachelor of Surgery (MBBS) from next year.

Health minister A F M Ruhul Haque told reporters on Friday (22nd Oct 2010) that the MBBS admission tests had been administered properly after visiting admission test centers at Dhaka University and Eden Women's University College. (<http://www.digitalbangladesh.gov.bd/>)

3.8.7 National database:

The parliamentary standing committee on the Ministry of Law, Justice and Parliamentary Affairs made recommendations to amend the National ID card Registration Bill- 2009.⁶

As a result for the first time made the national database. And we saw some of its reflection on last national election 2008.

3.8.8 United Nations E-Government Survey 2010:

From the United Nations E-Government Survey 2010 we find that citizens are benefiting from more advanced e-service delivery, better access to information, more efficient government management and improved interactions with governments, primarily as a result of increasing use by the public sector of information and communications technology.

According to United Nations E-Government Survey 2010 E-Government Ranking of Bangladesh is 134 out of 184 countries. Year 2008 it was 142, in 2005 it was 162.

Factors	Bangladesh	World average
E-Government Index	0.303	0.441
Online Service Index	0.356	0.286
Infrastructure Index	0.033	0.236
Human Capital Index	0.518	0.797
E-Participation Index	0.1	0.205

TABLE 2: BANGLADESH DATA COMPARISON WITH WORLD LEADER

Table 3 shows that the **E-Government Index of Bangladesh (0.303)** scores below the world average (0.441) while **Online Service Index (0.356)** followed by world average (0.286). In addition we see that **Infrastructure Index (0.033)** too much low compared to world average score 0.236. Moreover while world average of **Human Capital Index** and **E-Participation Index** are respectively 0.797 and 0.205 Bangladesh followed by 0.518 and 0.1. **E-Participation Index more than half with world average. In contrast**

Year	Index score
2003	0.165
2004	0.1788
2005	0.1762
2008	0.2936
2010	0.3028

TABLE 3: BANGLADESH E-GOVERNMENT INDEX TREND

Table 2.5 reflects the E-Government Index Trend from year 2003 to 2010. Interesting thing is that year by year index score is increasing. But compare to world largest score country it's too low. And need more work to improve the e-government score in Bangladesh.

3.8.9 Global Information Technology Report (GITR) 2009-2010:

The World Economic Forum-INSEAD prepared "Global Information Technology Report (GITR) 2009-2010" reviewed Bangladesh's placement on three key ICT indicators: (a) environment (infrastructure, market and political), (b) readiness and (c) usage. Bangladesh ranks 118 out of 133 countries. The country's overall low ranking highlights the urgent need for improvements in areas such as (i) the regulatory framework, (ii) developing human resource capacity, (iii) providing greater access and increasing usage of ICT by citizens and (iv) Investing in ICT infrastructure. (www.thedailystar.net)

From the above we see that only e-government preliminary stage .all government agencies giving only information and the form download facilities, nothing more. In case of online banking some banks allowing their customer only showing balance. But Dutch Bangla bank (<http://www.dutchbanglabank.com/>) allowing their customer to transfer money but there are also limitation that they cannot transfer to other bank client.

On the other hand more progress we can see in case of Brokerage houses. Most of the listed Brokerage house gives online trading facilities including sales, purchase and information sharing.

Moreover Utility bills can be paid through mobile. Finally we can say e-government in Bangladesh in primary stage.

3.9 Summary of theoretical Findings

Our theoretical finding says that there are some standard usability principles to be followed in the selected three e-service of the Bangladesh Government to find out high usability expected by the citizen of Bangladesh to reach a high degree of usability. In our theoretical study, we found the role of usability attributes while using the e-services by the citizens. We found the importance of usability principles proposed for website design by standard authors, which will be useful in evaluating the usability of the selected e-services provided by local govt. of Bangladesh. According to our theoretical findings, we have created a theoretical framework, which leads to an empirical study, where the usability criteria's will be evaluated for those selected e-service are found and analyzed using our theoretical findings.

Theoretical framework:

- Are the e-services provided by the local government in Bangladesh perceived usable by the Citizen? To answer the main question, first we have observed those selected e-services, which usability design criteria these e-services have (Research sub ques. 2) according to theoretical basis described in section 3.4.4 and 3.4.5, then we find out the expectation of citizens (Research sub ques. 1) through survey and then we analyzed the data to get an conclusion.

This overall question is subdivided into detailed questions as:

1) What are the expectations of the citizens? To find out the answer of this research sub-question we have done the survey. The survey questionnaires are set according to the usability criteria which we have described in section 3.4.4 and 3.4.5. We have shown the survey finding in the next chapter as empirical findings.

2) What design criteria have been used when designing the e-services? To find out the answer of this research sub-question we have observed and evaluate those three selected e-services according to the IT system functionality (described in chapter 2) and according to the g-Quality model and communicative criteria. The evaluated or examined e-services functionality and design criterion according to g-Quality model has been described in empirical findings as Set B as because we have categorize our result according to the fig - 2 which described in chapter 2 level as research strategy.

3) What design criteria should be added in order to increase the possibilities to satisfy the citizens' expectations? To answer this final research sub-question we have find the answer of first 2 research sub questions and based on the answer of those research sub questions we have suggested the design criteria of e-services for developing countries in order to increase the possibility to satisfy the expectation of citizens.

3.10 Arguments for an empirical study

Our research purpose is to create an understanding on some selected e-services provided by the local govt. of Bangladesh based on certain usability principles and criteria's. As the theoretical study of usability criteria's and models can create understanding only to some extent. There is always a fact that the usability criteria's can be understood clearly, when it is analyzed through real time applications. Therefore according to the research question we would like to find out the citizens expectation for developing those selected e-services according to their expectation, which can be done only through empirical study. In our empirical study we showed two different result, i.e. one result will come through observation by the researchers and second one is the online survey. For doing the online survey we have prepared some questionnaires and send it to the people of Bangladesh community. So an empirical study needs for the theoretical study on which we to can put the result and analyzed the data to carry our research.

4. Empirical Study

This chapter presents the theoretical data collected from each of the three respondents studied in the case. It starts with description of each respondents facts and the observed functionality, followed by the presentation of some validation aspects to ensure suitability of each sample according to the purpose of the study.

The findings are structured according to figure 1 in section 2. Set A, set B are sequentially presented below. Set C (Existing usability guidelines) are presented and discussed in section 3.

4.1 Empirical Data

Existing e-service Status (Set A)

The first step involve in categorizing the functionality of the e-service. Secondly we use the checklist piloting which enable detection of possible inconsistencies according to the criteria and its component. The checklist is added at appendix A.

According to the fig-2 the evaluated functionality will pointed on the basis of existing functionality of IT-systems (e-service) and the missing (needed) functionality will come from the expectation of the users of the system. Existing functionality is broken down into two parts used and not used in which they have several sections. On the basis of figure 2 we have broken down the e-services related to study are described below.

4.1.1 Sample A: Ministry Of Education, Government of people Republic of Bangladesh

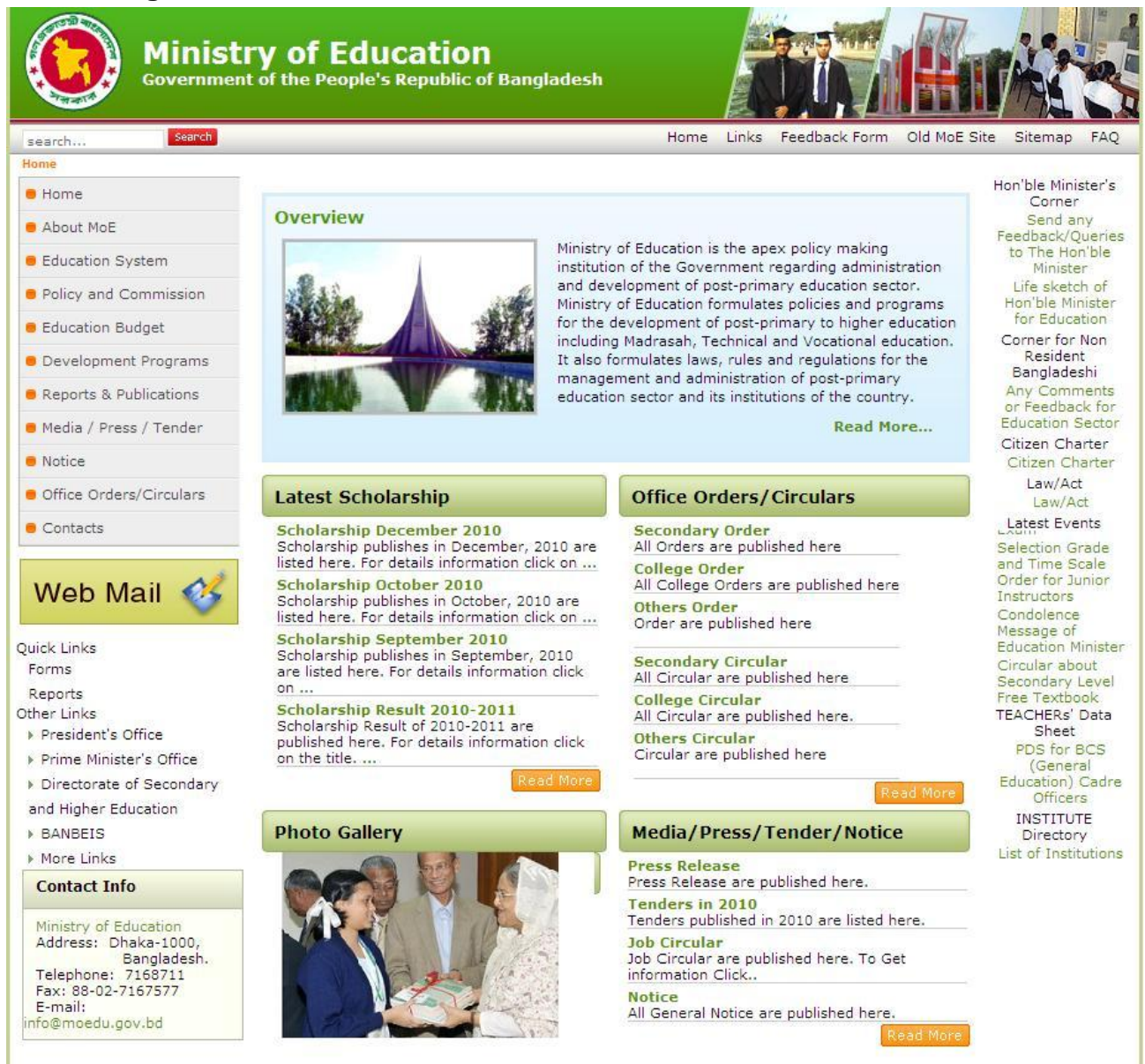


Figure 7: Ministry of Education website of Government People's Republic of Bangladesh

Website: (Ministry Of education)

Ministry of Education formulates policies and programs for the development of post-primary to higher education including Madrasah, Technical and Vocational education. It also formulates laws, rules and regulations for the management and administration of post-primary education sector and its institutions of the country. There are several attached bodies for supervision and management of formal education in post-primary and secondary schools, colleges, madrasahs, technical schools and colleges, polytechnic institutes, engineering colleges and universities. (www.moedu.gov.bd)

The ministry of education provides a variety of e-services to the citizen mostly by providing online information and downloading forms. The ministry has a great interest in developing its e-service capabilities but feels it still has a long way to go to make it more user-interactive.

The table below shows the breakdown of functionality according to the figure 2(Evaluating IT systems functionality)

		Used	Not Used
Good Support		<ul style="list-style-type: none"> • Scholarship information • Background of the ministry • Site map • Corner for non-resident Bangladeshi • Education System • Law\Act 	<ul style="list-style-type: none"> • Interface in local language (Bengali) • encouraging message (here have no encouraging message for people which can make interest to people to go for education)
Complicated		<ul style="list-style-type: none"> • Development Budget • PDS for BCS cadre officer 	<ul style="list-style-type: none"> • Development Programs
Wrong way		<ul style="list-style-type: none"> • List of Institution(because some of the institute's data not given) • Web mail (who are the user of webmail) • Honorable minister's corner 	
Not needed		<ul style="list-style-type: none"> • Life sketch of Honorable minister of education • link for "old Ministry of Education site" • Photo gallery 	
Unknown	Needed	<ul style="list-style-type: none"> • Directorate of secondary and higher education • Bangladesh Bureau of Educational Information and 	<ul style="list-style-type: none"> • Citizen charter corner

		Statistics	
	Not Needed		<ul style="list-style-type: none"> Teacher's data sheet

TABLE 4: BREAKING DOWN FUNCTIONALITY FOR MINISTRY OF EDUCATION E-SERVICE.

After breaking down the functionality of respondent A, we pointed the current usability level. The matrix below summarizes the present usability level that respondent A has. The checkmark (√) is used as positive acknowledgement and (×) is used as negative acknowledgement. And (–) is used to indicate the component is not applicable for that criterion.

Component	MOE's usability Level				
	Criteria				
	Cognitive Effort	Tolerance	Reach	Physical Effort	Trust
Status visibility	×	×	–	–	–
Site compatibility with real Life	√	–	√	–	–
User control & Freedom	×	√	–	–	–
Consistency & Pattern	√	×	√	–	–
Error Prevention	×	–	–	–	×
Recognition instead of Recall	×	–	×	–	–
Flexibility and efficiency of use	√	–	√	√	√
Aesthetics/ minimalist design	√	√	–	–	–
Error prevention & Diagnosis	×	×	–	×	–
Help and Documentation	×	×	×	–	–
Accessibility	√	–	√	–	–
Interoperability	–	–	√	×	–
Security and Privacy	–	–	–	–	×

Information Reliability	—	—	—	—	√
Service Agility	—	×	—	—	×
Transparency	—	×	—	—	×

TABLE 5: THE CURRENT LEVEL OF USABILITY OF MOE

Below is an explanation of collected data. The website has a clear indication of its purpose. It has a variety of information and links available for its users. It allows the users to explore, browse and access the data and download forms. The user can not fill out the form online and also can't able to send via online. This se-service just provides the citizen only to access explore and browse the data.

The website has some very good usability functions such as clear and understandable content. There are a variety of ways to search for information on the site, through either the search engine or different links on the site. Users coming to the site will find the information they are looking for but no further direct interaction with the service provider. Further contact is made either by telephone or email.

Graphics and link are clear and understandable. There is no other type of multimedia available on the site. Therefore, in this e-service some useful things are putted in wrong way but that information's are important to the users/citizens. Such as ministers corner, through which a citizen connect to the authority. Table 5 gives a clear understanding on evaluated functionality of ministry of education e-service.

4.1.2 Sample B: National Board of Revenue, Government of the People's Republic of Bangladesh

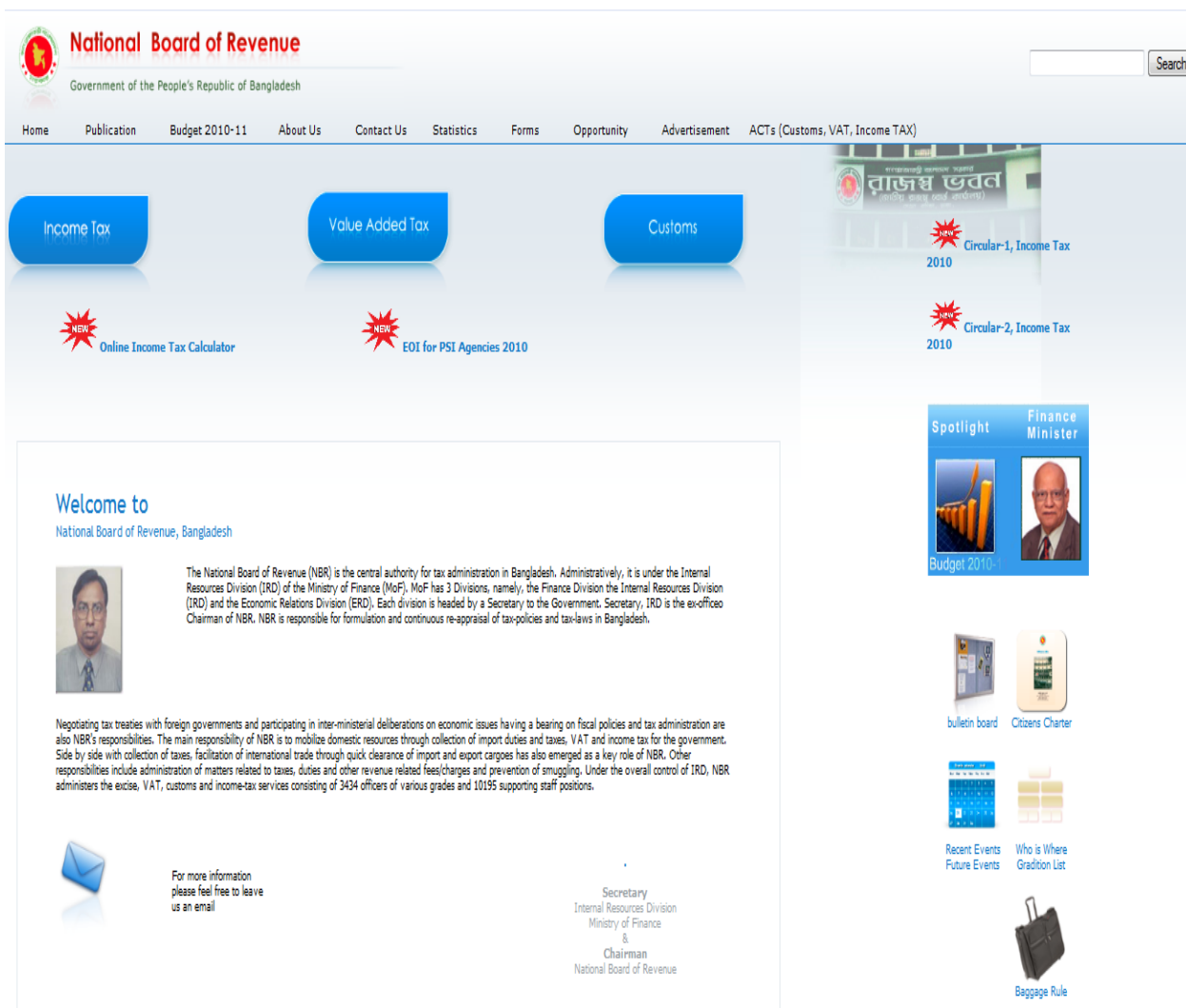


Figure 8: the National Board of Revenue (NBR) website of Government People's Republic of Bangladesh

<http://www.nbr-bd.org/>

The National Board of Revenue (NBR) is the central authority for tax administration in Bangladesh. The main responsibility of NBR is to mobilize domestic resources through collection of import duties and taxes, VAT and income tax for the government. Side by side with collection of taxes, facilitation of international trade through quick clearance of import and export cargoes has also emerged as a key role of NBR. Other responsibilities include administration of matters related to taxes, duties and other revenue related fees/charges and prevention of smuggling. Under the overall control of IRD, NBR administers the excise, VAT, customs and income-tax services consisting of 3434 officers of various grades and 10195 supporting staff positions. (www.nbr-bd.org)

The table below shows the breakdown of functionality according to the figure 2(Evaluating IT systems functionality)

		Used	Not Used
Good Support		<ul style="list-style-type: none"> • Flexibility of the site • Online income tax calculator • spotlight on circular • simple site • Contact Detail (Full Official) • Budget Report Publication • Total Statistics Idea Submit • Forms 	<ul style="list-style-type: none"> • Interface in local language (Bengali) • need more message about it goal on home page • No quarry opting added. • Important links
Complicated		<ul style="list-style-type: none"> • in “form ” VAT registration procedures written in bangle on the other hand all forms are in English • Web Data’s are presented in a complicated way 	<ul style="list-style-type: none"> • Development Programs
Wrong way		<ul style="list-style-type: none"> • Message from the secretary and chairman(because it’s a government site so no need to expose one’s picture .actually this should not be in home page • Citizens Charter Information 	
Not needed		<ul style="list-style-type: none"> • Pictures of the governing body 	
	Needed	<ul style="list-style-type: none"> • Advertisement 	
Unknown	Not Needed		

TABLE 6: BREAKING DOWN FUNCTIONALITY FOR NATIONAL BOARD OF REVENUE E-SERVICE.

After breaking down the functionality of respondent B, we pointed the current usability level according to g-Quality model. The matrix below summarizes the present usability level that respondent B has.

Component	NBR's usability Level				
	Criteria				
	Cognitive Effort	Tolerance	Reach	Physical Effort	Trust
Status visibility	×	×	–	–	–
Site compatibility with real Life	√	–	×	–	–
User control & Freedom	×	√	–	–	–
Consistency & Pattern	√	×	√	–	–
Error Prevention	×	–	–	–	×
Recognition instead of Recall	×	–	×	–	–
Flexibility and efficiency of use	√	–	√	√	–
Aesthetics/ minimalist design	√	√	–	–	–
Error prevention & Diagnosis	×	×	–	×	–
Help and Documentation	√	×	×	–	–
Accessibility	√	–	√	–	–
Interoperability	–	–	√	×	–
Security and Privacy	–	–	–	–	×
Information Reliability	–	–	–	–	√
Service Agility	–	×	–	–	×
Transparency	–	×	–	–	×

TABLE 7: CURRENT LEVEL OF USABILITY OF NBR

Below is an explanation of collected data. The website has a clear indication of its purpose. It has a variety of information and links available for its users. It allows the users to explore browse and access the data and download forms but the user can not fill out the form online. And after filling up can send by post. For users this website just provides them

to access explore and browse the data.

It took three clicks or page changes to access the appropriate site. The website has some very good usability functions such as clear and understandable content. There are a variety of ways to search for information on the site, through either the search engine or different links on the site. Users coming to the site will find the information they are looking for but no further direct interaction with the service provider. Further contact is made either by telephone or email.

Graphics and link are clear and understandable. There is no other type of multimedia available on the site. Therefore, in this e-service some useful things are putted in wrong way but that information's are important to the users/citizens. Such as ministers corner through which a citizen connect to the authority. Table 5 gives a clear understanding on evaluated functionality of ministry of education e-service.

4.1.3 Sample C Bangladesh Road Transport Authority (BRTA), GOVERNMENT OF the People's Republic of Bangladesh

The screenshot shows the official website of the Bangladesh Road Transport Authority (BRTA). The header is green with the BRTA logo on the left and the text 'BANGLADESH ROAD TRANSPORT AUTHORITY' and 'BRTA OFFICIAL WEBSITE' in the center. Below the header is a red navigation bar with links: HOME, CONTACTS, ORGANOGRAM, ORDINANCE, ACTIVITIES, LOCATIONS, FAQ, FORMS & FEES, STATISTICS, and SITEMAP. The main content area has a sidebar on the left with a menu of services and news. The central part of the page features a text block describing BRTA's regulatory role, followed by icons for 'Tender Dox' and 'Driving License Exam Result (Dhaka Metro Board Only)'. Below this is a contact section with an email address and location. There is also a section for 'Important Notice Board' with several notices, and a 'List of Bank Branches' link.

Figure 9: BANGLADESH ROAD TRANSPORT AUTHORITY WEBSITE OF GOVERNMENT PEOPLE'S REPUBLIC OF BANGLADESH

Bangladesh Road Transport is a regulatory body to control manages and ensures discipline in the road transport sector and road safety related areas in Bangladesh. It providing services namely Registration of Motor Vehicles, Issuance of fitness certificate of motor vehicles, Issuance of Route permit for Transport Vehicles, Issuance of Motor Driving Licences, Issuance of Motor Driving Instructor’s License, Registration of Motor Driving Training Schools, Inspection of Motor Vehicles involved in road accidents, Inspection of Government Vehicles for Repair etc. Besides, BRTA takes different measures in order to promote road safety and coordinates road safety prevention activities undertaken by different agencies/organizations. (<http://www.brta.gov.bd>)

BRTA provides a variety of services to the citizen mostly by providing online information and downloading forms. The ministry has a great interest in developing its e-service capabilities but feels it still has a long way to go to make it more user-interactive.

The table below shows the breakdown of functionality according to the figure 4(Evaluating IT systems functionality)

	Used	Not Used
Good Support	<ul style="list-style-type: none"> • Traffic guidelines • Site map • Good links • User Feedback 	<ul style="list-style-type: none"> • Recent activities of BRTA • Need to be Language independent • Maps of the city
Complicated	<ul style="list-style-type: none"> • Homepage(because lots of thing on same page ,not organized) • Bengali and English mixed page could make problem to the people. 	<ul style="list-style-type: none"> • Development Programs
Wrong way	<ul style="list-style-type: none"> • Bengali –English combination • Most of the information, like mobile phone numbers, is half filled. • Tender box should not be in the middle of home page. Because site’s main concern should focus on rules 	

Not needed		<ul style="list-style-type: none"> • Pictures of the governing body. 	
Un-known	Needed	<ul style="list-style-type: none"> • Forms should be in both Bengali and English version 	
	Not Needed		

TABLE 8: BREAKING DOWN FUNCTIONALITY FOR BANGLADESH ROAD TRANSPORT AUTHORITY E-SERVICE.

After breaking down the functionality of respondent C, we pointed the current usability level. The matrix below summarizes the present usability level that respondent C has.

Component	BRTA's usability Level				
	Criteria				
	Cognitive Effort	Tolerance	Reach	Physical Effort	Trust
Status visibility	×	×	–	–	–
Site compatibility with real Life	×	–	×	–	–
User control & Freedom	√	√	–	–	–
Consistency & Pattern	√	×	√	–	–
Error Prevention	×	–	–	–	×
Recognition instead of Recall	×	–	×	–	–
Flexibility and efficiency of use	√	–	√	√	–
Aesthetics/ minimalist design	√	√	–	–	–
Error prevention & Diagnosis	×	×	–	×	–
Help and Documentation	√	×	×	–	–
Accessibility	√	–	√	–	–
Interoperability	–	–	√	×	–
Security and Privacy	–	–	–	–	×
Information Reliability	–	–	–	–	√

Service Agility	–	×	–	–	×
Transparency	–	×	–	–	×

TABLE 9: CURRENT LEVEL OF USABILITY OF BANGLADESH ROAD TRANSPORT AUTHORITY (BRTA)

Below is an explanation of collected data. The website has no clear indication of its purpose. It has a variety of information and links available for its users. It allows the users to explore browse and access the data and download forms, press release. For users this website just provides them to access explore and browse the data.

The e-service is not well organized though the links make it quite understandable to the user. It has some good usability functions such as help and documentation of filling up forms, through which users can get better understanding to filling the forms manually after downloading it. There are a variety of ways to search for information on the site, through either the search engine or different links on the site. Users coming to the site will find the information they are looking for but no further direct interaction with the service provider. Graphics and link are clear and understandable. There is no other type of multimedia available on the site. Table 7 gives a clear understanding on evaluated functionality of Road and transport authority of Bangladesh local govt.

4.2 Citizens expectation (Set B)

To know the citizens expectation we have performed the survey. In the section below we have described survey questionnaires and also the survey findings.

4.2.1 Survey Questionnaires formulation

In order to obtain high response rate the questionnaire has been sent to a class of people who are most frequently use internet aged limit 21 to 40 and above. This population group consists of professionals and students having more active development and innovative ideas in the society. We have distributed questionnaire through e- mail and face book because it is the easiest and quicker way to communicate with the respondents from distance.

The symmetry of questions has been maintained by sequencing the questions accordingly. There are multiple choices so that respondent can response quickly and some text box to collect respondents view about the specific service. Necessary notes have been given to guide the respondent where it is required. Beside this we have divided questions in to part

1, part 2, part 3 and part 4 respectively for general information, Ministry of Education, National Board of Revenue and Bangladesh Road Transport Authority because to have to gather information about these couple of service.

We have started by asking respondent's name and e-mail for keeping track of the respondent. Then we go through with some general question (question 3 to 5) about respondent personal details for keeping profile of the respondent. We continued asking respondent about internet usage (question 6, 7) because e-Services are mainly concerned with internet infrastructure. Therefore this is important to know how often people use internet.

Eighth question is an open format question with this we come to know which government e-service citizen use because our main target to get suggestion from respondent about three services that we chosen.

In part 2, part 3 and part 4 same question are repeated to gather information individually respectively MoEdu, NBR and BRTA. In question 9 we come to know this particular site is well organized or not according to them.

With the question 10 we can gather information about the simplicity of the site. Then with the close ended questions 11; we come to know people get feedback from the authority or not.

Questions 12; which helps us to gather their satisfaction regarding information from Government. Then we have 13th question which is also an open ended question. Respondents are supposed to give their suggestions and opinions about Government to Citizen e-Services satisfaction regarding information. Every respondent can feel free to express his/her feelings which can be necessary to articulate. Moreover we collect different suggestions about what more information Government should provide on these e-Services. These suggestions will move us ahead to make the site more informative and interactive.

There is some irrelevant information on the three evaluated e-service which can make citizens a bit confuse.

There is some lacking in the e-service features according to users. In fifteenth question; we asked if there need to add more features to give more service to them. Through question 16; we get citizen's point of view about automation and the site is interactive or not.

Day by day Bangladesh citizen's internet literacy increasing as well as their expectations also increasing. moreover The respondents are IT literate so it is important to ask whether need more e-service from government of Bangladesh. So by asking question 17 and 18; we can gather information whether there should be more e-Services respectively; provided by the Government of Bangladesh.

Finally the 20th question is to get any comments if the citizens have regarding the e-service in the means of e-government.

4.2.2 Survey Result

It was difficult to get suggestions from Bangladeshi citizens while living far from here. As we have mentioned in chapter 2, data collection section, we have done the survey by sending mail to different online groups, our own personal contacts. We have also use facebook, another way to get the citizens suggestions. A total of 300(may be more) were sent to certain person of Bangladeshi community. From them only 20% replies were made available. Though it's a small set of replies, but we got significant data from these 20% respondents.

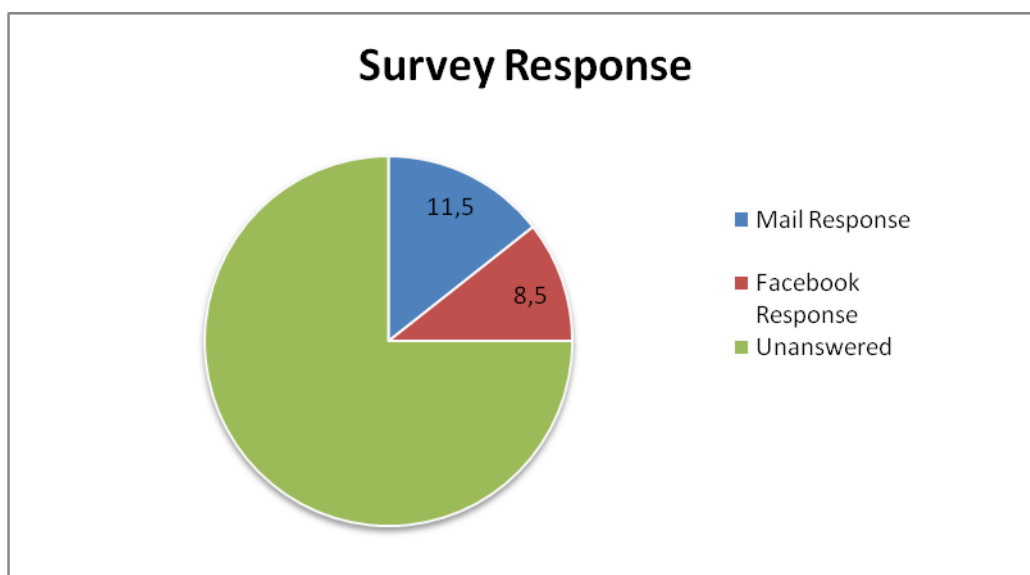


Figure 10: Survey Response

The following survey result presents 60 respondents. They (citizen) have responded willingly. The description against each questions are given below. Every respondent answered the sixth question which shows a large number of respondents are using internet in their daily routine as there were 53 such respondents. Only few people use internet alternatively. Most of the respondents want e-Services because it will save the time, money, and resources by getting increased efficiency and better communication among the citizens and Government. This shows how current generation in getting converted towards online usage.

There are some e-services implemented in Bangladesh, but in our survey we have clearly ask about three particular e-service namely national educational service, National Road transport

authority and National Board of Revenue. A total of 38 respondents have used those 3 services frequently. Therefore 12 respondents used the Taxation (NBR) e-service, 14 respondent used educational e-services and rest 8 respondent uses the Road transport authorities (BRTA) e-service.

According to them, the information/data is not well organized except the education e-service. They did not get update information from those e-services as they are not updated properly. More over the respondents want total interactive e-service especially in case of taxation and Road transport authority’s e-services.

Therefore none of the respondents are satisfied with these three e-services. Among them 39 respondents are partly satisfied.

4.2.3 Summary of survey findings

The summary of survey findings are shown in the following table.

Area	Findings
Internet Usages	<p>All the respondents have experience for internet usage</p> <ul style="list-style-type: none"> • 96% of the respondents use internet daily • Remaining 4% are using it alternatively <p>Large number of citizens are using internet which will increase the online usage of e-Services and their value in the social arena</p>
Expectation	<p>Every respondent wants that the e-services should be interactive. All of them wants to fill the form online and also wants to send it online as well.</p> <ul style="list-style-type: none"> • Acknowledgement form the authority after receiving application • To check the status of the application from anywhere • Declaration of tax via online • Online Vehicle registration • Online registration for the exam • Online Visa Apply • Land and construction

	<ul style="list-style-type: none"> • Online application for Birth/death/marriage certificate • Internet facilities
Intension	<p>Every respondent has recommended that there should be e-Services from e-Government.</p> <ul style="list-style-type: none"> • 69% respondents use available e-Services when they needed • 31% have not used any e-Services
Usability criteria	<p>Every responded wants the following usability criteria's in those e-services</p> <ul style="list-style-type: none"> • Both way communication (interactive and transactional) • Search engine form any page • The system should informed the user about the ongoing process • Detailed information about any topic • Security • Error diagnose and recovery • Proper documentation

TABLE 10: SUMMARY OF SURVEY FINDINGS

4.2.4 Citizens' Choice

RQ: What are the expectations of the citizen?

According to (Holowczak, 2001) Government services should be implemented by the citizen's personnel choice which are based on different tasks and made applicable by the Government and to make improvement in access of service to citizens. It means that Government should take more responsibility for making these e-Services applicable by providing easy access to the citizens. This is also pointed out from the survey result that Government of Bangladesh needs to identify the importance of e-service to citizens and the services should reflex the needs of citizen's. An emphasis is also given by (Grönlund, 2005) and centric (Scott, et al, 2005). The survey result pointed that up gradation are required for implemented e-Government services in Bangladesh. Though lots of informative websites are available but still their usage is not so common.

The following table 12 shows what the citizens expectation from the aforementioned e-services.

Category	Service Type	No of respondent
Education		
Online Admission Process	Interactive, transactional	6
Online Educational Libraries	Informative	4
Seeing educational results and information	Informative, Interactive	4
Educational Services	All	2
Enrolment in the higher education	Interactive, Transactional	2
Virtual University Services	Informative, Interactive, Transactional	2
Online Education	All	2
Finding universities	Informative	1
Training Courses by ministry of Education	Informative, Interactive, Transactional	1
Application for Studies	Interactive	1
Academic Assignments	Informative, Interactive, Transactional	1
Exam Forms Submissions	Interactive	1
Information for Students studying at abroad	Informative	12
Education Information Services	Informative	1
Paying Education Fee	Transactional	10
Public libraries	Informative	1
Taxation		
Paying taxes	Transactional	15
Paying Income Tax & Declaration	Transactional	8
Property Tax Records	Transactional	2

Tax Deduction and Reports	Informative	10
Paying state taxes	Transactional	1
Income Tax Records	Transactional	1
Tax Calculation, Payment and Refund Claim	Transactional	1
Online Taxation System Services	Informative, Interactive, Transactional	1
Road Transport Authority		
Car Registration	Transactional	10
Renewing a driving license	Transactional	5
Issue and Renewal of Driving Licenses	Informative, interactive	6
Traffic License information	Informative	12

TABLE 11: CITIZENS EXPECTATIONS FROM E-GOVERNMENT

We have described set C “Existing usability guidelines for e-government” in chapter 3, section 3.4.2 labeled as usability.

5 Analysis and Results

In this chapter we analyze the data presented in the previous chapter. We have followed the emerged framework in chapter 3 as our procedure to analyze the presented data.

5.1 Selected sample Analysis and Data Interpretation

To present a better understanding of data, we have compared the data across the respondents from the previous chapter in the case according to the g-quality model as we have mentioned in chapter 3. In order to make this data display as clear and concise as possible, the case data will be presented in an abbreviated and coded manner, in order to help obtaining a more integrated understanding of interactions.

(A, B and C will present Educational, Taxation and Road transport authority respectively)

Component	MOE, NBR, BRTA usability Level														
	Criteria														
	Cognitive Effort			Tolerance			Reach			Physical Effort			Trust		
	A	B	C	A	B	C	A	B	C	A	B	C	A	B	C
Status visibility	×	×	×	×	×	×	-	-	-	-	-	-	-	-	-
Site compatibility with real Life	√	√	×	-	-	-	√	×	×	-	-	-	-	-	-
User control & Freedom	×	×	√	√	√	√	-	-	-	-	-	-	-	-	-
Consistency & Pattern	√	√	√	×	×	×	√	√	√	-	-	-	-	-	-
Error Prevention	×	×	×	-	-	-	-	-	-	-	-	-	×	×	×
Recognition instead of Recall	×	×	×	-	-	-	×	×	×	-	-	-	-	-	-
Flexibility and efficiency of use	√	√	√	-	-	-	√	√	√	√	√	√	-	-	-
Aesthetics/ minimalist design	√	×	×	√	√	√	-	-	-	-	-	-	-	-	-
Error prevention & Diagnosis	×	×	×	×	×	×	-	-	-	×	×	×	-	-	-
Help and Documentation	×	×	×	×	×	×	×	×	×	-	-	-	-	-	-

Accessibility	√	√	√	-	-	-	√	√	√	-	-	-	-	-	-
Interoperability	-	-	-	-	-	-	√	√	√	×	×	×	-	-	-
Security and Privacy	-	-	-	-	-	-	-	-	-	-	-	-	×	×	×
Information Reliability	-	-	-	-	-	-	-	-	-	-	-	-	√	√	√
Service Agility	-	-	-	×	×	×	-	-	-	-	-	-	×	×	×
Transparency	-	-	-	×	×	×	-	-	-	-	-	-	×	×	×

TABLE 12: MOEDU, NBR, BRTA CROSS RESPONDENTS DATA ANALYSIS

Table 10 represents the current status of inspected usability criteria's that contains by the three particular e-services based on the g-quality model.

The mark (√) indicates the current usability issues that they have, and the mark (×) indicates the missing or not implemented usability criteria and the mark (-) indicates the components which are not applicable to those criteria.

It is clear from table 10 that none of three services has fulfills the usability criteria's according to the g-quality model. But there are good things that these services has match with the real world, creating specific pages for each specific navigation level. None of the service has transparency. The e-services also have minimalist design but none of them has error recovery and diagnosis documentation to help the user. Information truth and precision, service agility is also missing. In below table-11 we have clearly shown the missing criteria's for these three e-services.

RQ: What design criteria have been used while designing the e-services?

To answer this question we use the above table in used in data interpretation section.

1) Visibility of system status:

As explained in section 3.4.4, it states that the system must provide a correct feedback to users about what is happening in the system when their task is being processed. Therefore, during observation and from the survey we may say that these three selected websites has no visibility of the system status. The user is not shown any waiting or information processing status on the screen. But according to the users the website at present is fast in processing these tasks so there is no need for a system status Therefore, the three selected e-service does not support this principle.

2) Use users own language:

As explained in section 3.4.4 the system must use the users own language with words, phrases and concepts that are user familiar. In ministry of education while observing the e-services, the language was simple and easy for the users. Especially the vocabulary was easy to understand on the home page where the users performed different tasks. But in National Board of Revenue (NBR) and Bangladesh Road transport Authority have used 2 languages such as English and Bengali (Local language of Bangladesh) which will create confusion to the user while doing their tasks. The developer should use the options to choose the language by the user themselves so that the users can choose language which is understandable for them. Therefore, only the MOE supports this design criterion.

3) User control and freedom:

As explained in section 3.4.4, this principle states that user's generally choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted situation without having to go through an extended dialogue such as undo or redo. The user control and freedom is missing in National Board of Revenue (NBR). The two other selected e-service i.e. ministry of education and Bangladesh Road transport authority are supporting this criteria, because user can navigate to home page from any pages of these two e-services.

4) Consistency and Patterns:

As explained in section 3.4.4 the system must be consistent within itself and also the standards followed in one part of the system must be followed throughout the system .For example if in one section of the system there is a design associated with the selection of checkbox button that particular standard must be followed through the entire system. So this principle is partially fulfilled by the three selected e-services.

5) Error prevention:

As explained in section 3.4.4 the error messages that are helpful to the user are always required. In the three selected e-services, when the users selected the advertisements on the home page many of the advertisements are not operational and did not display any error messages. So according to this, MOE, NBR and BRTA do not support this design criteria.

6) Recognition instead of Recall:

As explained in section 3.4.4 it states that the system objects, actions and options must be visible to the user, so that there is no need for the user to memorize the information contained in one part of dialogue to the other. Therefore in our three selected e-service provide

information's in text or by downloading the form. And moreover this criterion hasn't been implemented yet on those chosen e-services.

7) Flexibility and Efficiency of use:

As explained in section 3.4.4 system must be flexible and easy to use for any level of user such as a novice user, Intermediate users and expert users by providing user manual or online help to users . Ministry of education provides good flexibility for the user. But we can not say that this e-service is efficient to use according the user and our observation. Therefore, the three selected e-services are not efficient to use and it does not supports the criteria.

8) Aesthetic and minimalist design:

As explained in section 3.4.4 the unnecessary information in the dialogues must be removed and also the information which is irrelevant in the dialogue competes with the necessary units of information which reduce its relative visibility. In our three selected samples, the web pages were found to be less aesthetically appealing. While we have categorize the e-service through our observation from the perspective IT system functionality and the survey we have found that there are lots of unnecessary information on the e-service of Bangladesh national board of revenue and Bangladesh road transport authority. So the ministry of education e-service is only supporting this principle where as the rest two e-services are not supporting this design criteria.

9) Error prevention & Diagnosis:

As explained in section 3.4.4 the error messages reported must be in the user's language and must inform about the problem and give a solution. In ministry of education e-service the errors occurred only in checking the online result of S.S.C and H.S.C. and therefore the system also inform to the user what to do. But in NBR and BRTA's e-service and did not produce any error message because there are no interactive service for citizens. Therefore Ministry of education supports this principle.

10) Help and Documentation:

As explained in section 3.4.4 users interact with computers to achieve some goals in specific business domain. The interaction contains features which provide support in successful achievement and assessment of the specific goal. Therefore, none of our selected e-service has documentation to help the users while achieving their goal.

11) Accessibility:

As explained in the section 3.4.4, e-gov. site should include all citizens. Consequently, the site should attend people with special needs. While observing the selected e-service we found that all of them accessible for normal people but there nothing for visually impaired persons. So we can say that all of these selected e-services are partially supporting these design criteria.

12) Interoperability:

According to the section 3.4.4, E-gov site should be able to exchange information and services as in actual government bureau. In order to achieve interoperability, at least communication protocols should be defined, but it is recommended standards. As the selected e-services are informative, these selected e-services needs to be interactive at first to achieve the interoperability. So we can say that this design criteria is not implemented in our selected e-service.

13) Security and privacy:

As explained in section 3.4.4, Government site should be protected against hackers because people will rely on the information. Additionally, citizens' information should be protected when sent to e-gov sites. These three selected e-services, after observing those e-service we found that the developers and also the govt. policy makers is not aware about this design criteria and therefore this criteria is not implemented in our selected e-services.

14) Information truth and precision:

As explained in section 3.4.4, Information must be true and precise since it will influence citizens' life. It is the government responsibility to maintain its sites updates and corrected. As per our observation we may say that the provided information is true but we can't say that the information are accurate because the information is not updated on all of the three selected e-service. So we can say that those selected e-services supporting partially this design criterion.

15) Service Agility:

As explained in section 3.4.4, service agility is measured on Time response to citizens' requests is fundamental to create trust; i.e. communication is a two-way road. Our selected e-services all are informative not interactive and neither transactional. In order to achieve the service agility, they must implement the two way communication between user and authority via e-service. Therefore, we can say that service agility is not implemented and thereby not supported in designing those selected e-services.

5.2 Suggestion for New Usability Guidelines (Set D)

5.2.1 New suggested support guideline for designers

RQ: What design criteria should be added in order to increase the possibility to satisfy the expectation of citizens?

In this paper we have tried to find out the missing usability criteria's by using g-quality model and from communicative criteria. Therefore, it is also found that which design criteria's have been used while developing the e-services. Though the g-quality model found more problems, in a more standard way, but this all criteria's can't be used in developing countries like Bangladesh where the e-service for e-government are still in primary stage.

After evaluating all the pages for each site, we have found that besides the usability problems, such as the lack of bad design, security, service agility, the sites reflected the lack of government responsibility for the digital inclusion. It is not enough to make infrastructure available for the citizen. In an e-gov. service two actors are communicating. A company or a customer needs information from the municipality in order to make decisions about the business or personal affairs and the application, i.e. the customer/company needs to be informed by the municipality and the municipality needs to inform the company or by the customer. The company is both a sender and a receiver and these are also the roles of the municipality in the communicating process. An e-government service is also about a human actor interacting with a computer. Handling the computer in an efficient way is important and a prerequisite for achieving communication between actors via the computer.

According to the communicative criteria (see section 3.4.2.2 Communication criteria for evaluation of public e-service) we can say that these e-services (Ministry of education, National Board of revenue and Road transport authority) have only interaction quality (ibid). Other two criteria i.e. communication criteria and goal criteria are completely missing. There is no way to communicate with authority via e-services, only to fetch the information. Our suggested guidelines are a combination of both g-quality model and communicative criteria.

In our suggested guideline there are 8 criteria which are mapped into three qualities of communication criteria (See section 3.4.2.2).

Visibility of System Status (Nielsen)

User control & Freedom (Nielsen)

Users Own Language (Nielsen)

Accessibility (g-Quality model)

Interoperability (g-Quality model)

Service Agility (g-Quality model)

Data/Information Transparency (g-Quality model)

Information truth and accuracy (g-Quality model)

Security (g-Quality model)

All those criteria's have been described in chapter 3 in section 3.4.2.1 and 3.4.2.2. We have mapped these eight criteria on three qualities on communication criteria (section 3.4.2.2).

From the below table 14 we can found that status visibility, accessibility and user control & freedom are mapped into interaction quality criteria and communication quality criteria respectively. In the interaction quality level, a user communicate with web based e-service, so the user should be inform through the e-service that what is going, what the **status** of his/her requested page. **Accessibility** is also mapped into interaction quality so that the e-service should be accessible for everybody from anywhere.

The communication quality supports the fulfillment of the goals of the authority and the goals of the citizens. As the communication takes place between two users (an authority) administrator and a citizen (or a representative for a company) and as the communication is mediated by the e-service **interoperability** and **service agility** which helps to fulfillment of the goals of the authority and the goals of the citizen by exchanging information between then and by giving services to citizen as in actual government bureau in timely manners.

Finally the goal quality is achieved through the components of communication quality. The authorities should supply **transparent data/information** in an **accurate** and **secure** way to the citizen.

		Communication criteria Quality		
		Interaction Quality	Communication Quality	Goal Quality
Combination of Nielsen and g-Quality model	Usability Component			
	Status visibility	√	√	
	User control & Freedom	√	√	
	Users own Language	√		√
	Accessibility	√		
	Interoperability		√	
	Service Agility		√	
	Data Transparency			√
	Information truth and accuracy			√
	Security			√

Table 13: Communicative criteria and suggested usability rules mapping

We think that our suggested guideline help the designers in developing countries to develop the e-services for e-government in the primary stage to satisfy the user needs.

6 Conclusion

In this chapter we bring to a close the findings from our research question, thereby fulfilling the stated purpose of the study. In order to do so, we reaffirm each of the research questions and answer them in separate sections, based on the research conducted. Based on the empirical data and the analysis, conclusions will be drawn. We will also give overall conclusions before presenting implications for developers and authorities, and future research.

6.1 RQ. 1 Are the e-services provided by the local government in Bangladesh perceived usable by the Citizens?

The conducted research indicates that the e-services (education, taxation, and road transport authority) have only little usability which is not very fruitful for user/citizen to use. The major problems with these e-services are:

- No proper feedback or visibility of systems missing about ongoing process.
- Users don't have freedom and control to manage its functions
- Missing of proper help with documentation,
- Not flexible to use, and the system will not guide the user while they make any mistakes or when any error occurred. Therefore the e-service has lack of security and agility of service.

From the survey we have found that citizens are satisfied not with the e-services. Most of them want the **per-formative** e-service through which they can perform the application process.

6.2 RQ. 2 What are the expectations of the citizens?

From the survey analysis we have find out the expectations of citizens are increasing towards e-Government. Following are the expected e-Services except the education, taxation and road transport authority.

Paying Utility Bills, Passport, Health and Care, Voting System, Citizen Directory, Birth/Death/Marriage Certificates, Hajj, Police, Banking, Visa Processing, Construction, Governmental Portal, Internet Facilities, Agriculture, Procurement, Social Benefits, Export, Firm Registrations, Insurance, Judicial Systems, National Savings, State Parks, TV/Radio

License.

Some of the above e-services namely paying utility bills, birth/Death/Marriage certificate, and hajj application processing are already implemented but they need more improvement to satisfy the citizens. Table 11 shows the summery of citizens' expectation of e-services.

6.3 RQ. 3 What design criteria have been used when designing the e-services?

All three e-services provided by three different ministries acknowledge the fact that the information presented in the website should have some sort of importance to the citizens. They have taken different development projects to make e-services available to everybody. They are keen to publish and present downloadable information to the citizen. The evaluated e-services currently have no special criteria to be focused; all of them are in their beginning stage. All of them have minimalist design, the information that the e-services contains have hierarchy pattern, standardized scheme of colors, fonts, links etc. therefore we have describe this sub research question in Data analysis chapter in section 5.1 elaborately.

6.4 RQ. 4 What design criteria should be added in order to increase the possibility to satisfy the citizens' expectations?

According to the collected data (set A and Set B) and from the data analysis, we have found that there are missing of visibility of system status, efficiency, error prevention, security and privacy, service agility and transparency. Moreover, according to Burger (2005), the expectations of e-citizens (trust and reliability, accountability and benchmarking, involvement and empowerment etc.) cannot be accomplished.

We have expressed our suggestion for new usability guideline in chapter 5 section 5.2.1.

6.5 Implication for Informatics

The implication or suggestion of our result may influence the developer as well as the govt. policy makers to design such e-services according to the users' expectation and to satisfy them and provide a good user-friendly interface with high degree of usability. The informatics area in our thesis may be regarded in a dialectical relationship between the user and the developer practices.

6.6 Overall Conclusion

The purpose of this research study was to provide better understanding of current usability level of e-services provided by the local government and the citizen's expectation. We have conducted an extensive analysis and managed to collect sufficient information in order to provide comprehensive answers to the research questions.

6.7 Result evaluation

“The credibility of qualitative research studies rests not just on the reliability of their data and methods but also on the validity of their findings.” (Silverman, 2001) In our thesis we have used data interpretation method for evaluating the primary and secondary data. These primary and secondary data are interpreted using hermeneutic perspective. The main advantage of using hermeneutic is the movement of understanding is constantly from the whole to the part and back to the whole.

When we consider the validity of a research study we need to ask two basic questions. First, does the study have sufficient controls to ensure that the conclusions we draw are truly warranted by the data? And second, can we use what we have observed in the research situation to make generalizations about world beyond that specific situation? The answer to these two questions addresses the issues of internal validity and external validity respectively. (Leedy, Ormrod, 2005).

External validity for a research, questions whether the empirical findings could be generalized or not. We used several sources to increase the external validity. All the external sources used in our thesis are standard universal sources used for designing the e-services provided by the government. In order to increase the validity, we have performed a detailed task table which will act as a guide for evaluating the web usability of those selected e-services. So testing students can successfully perform their tasks using the task table which we have added in appendix A and B.

According to Merriam, “if the researched area is dynamic, the definition reliability in a conventional meaning is impossible to reach.” We do not believe that the usability criteria that are used in designing those evaluated e-services are dynamic; therefore we believe that the usability study of it will be relevant also in the future. It is our hope that the thesis will enable the selected e-service provided by Bangladesh Govt. will reach a high degree of usability with our conclusions which will increase the possibility to satisfy the citizens.

Two key things that can increase reliability are use case protocol and the development of a case study database (Chisnall, 1997). To increase the reliability, we have prepared open-ended questions to know the expectation of the citizens which should be consider while developing the e-services.

Reliability deals with the problem of the degree to which the investigation would produce the same results if repeated.

In our case, validity and reliability has achieved by focusing on key services and relevant expectations from citizens as results from the questionnaires. The validity has ensured throughout research by using relevant literature and the questionnaires have formulated by collecting the expected information. Although in qualitative and partially quantitative research approaches it is hard to maintain the reliability but we have tried to attain it by managing the contents, sequence and physical layout of questionnaires.

6.8 Recommendations for further research

Our research findings depict that citizens are not satisfied with the service from Bangladesh government that shows need more improvement of these services. And with the time being the expectation of citizen will be changed and by revising this paper it is possible to propose new things for near future. Moreover we did the survey in such a way so that we can cross check survey result with the usability criteria properly. There is a program running by UNDP named as “Access 2 information (project a2i)” through which people know the use of internet and e-government in rural areas. So we think it a good paper for further research. Further research is needed to identify other related factors that were overlooked by this study.

Reference

- Aaker, D., et al, (1998), 'Marketing Research', Sixth edition
- Ana Cristina Bicharra Garcia, Cristiano Maciel, and Fernando Bicharra Pinto: A Quality inspection Method to Evaluate E-Government Sites Universidade Federal Fluminense Rua Passos da Pátria, 156 sl 326, Niterói, RJ, Brazil
- Asiimwe, E, N and Lim, N. (2010) "Usability of Government Websites in Uganda" *Electronic Journal of e-Government* Volume 8 Issue 1 2010, (pp1 - 12), available online at www.ejeg.com
- Ancarini A (2005). Towards quality e-service in the public sector: The evolution of web sites in the local public service sector, *Managing Service Quality*, Vol. 15 (1), p 6-23
- Bangladesh Enterprise Institute (BEI), "A study of e-government in Bangladesh", April 2004
- Burger@Overheid.nl(2005). e-Citizen Charter, Version 2.1 . Retrieved December 3, 2008, from www.burger.overheid.nl/files/burgerservicecode_uk.doc
- Buckley J (2003). E-service quality and the public sector, *Managing Service Quality*, Vol 13 (6) p 453-46
- Cappel, J. J. & Huang, Z. (2007). "A usability analysis of company websites", *The Journal of Computer Information Systems*, vol 48, no. 1, pp. 117-123.
- Chisnall, M. (1997), Marketing Research, McGraw-Hill
- Chowdhury, Mridul and Raihan, Ananya (2001), "Bangladesh", Global Information Technology Report 2000-2001, Publication of Harvard University and World Economic Forum, Oxford University Press
- Chowdhury, Mridul and Taifur, SASM (2003), "Problems of e-Government in Bangladesh and Possible Steps towards Solution", Presented at Conference on 'Roadmap for ICT.
- Cronholm S. (2010) Communicative Criteria for Usability Evaluation. In proceedings of the Australasian Computer-Human Interaction Conference (OZCHI). Brisbane, Australia.
- Development in Bangladesh' organized by Bangladesh Computer Council, held on 30th June, 2003 at IDB Bhaban, Dhaka
- "E-governance project starts next month" source-The daily star- Wednesday, December 30, 2009 .
- Fountain, Jane (2001), "Building the Virtual State: Information Technology and Institutional Change", the Brookings Institution.
- Gabardi, Wayne. 2001. .Contemporary Models of Democracy. *Polity*. 33(4): 547-568.
- Grönlund, Å. and Horan, T., (2005), 'Introducing E-Gov: History, Definitions, and Issues Communications of AIS', Volume 15, Article, May, pp 12-14.
- E –Government Blueprint California Franchise Tax Board, California Franchise Tax Board's vision, goals & strategies for transforming the relationship with customers through electronic commerce opportunities Members of the Board, Kathleen Connell, Chair Dean Andal, Member B. Timothy Gage, September 2000.
- Heeks, R. (2002). "e-Government in Africa: Promise and practice", *Information Polity*, vol. 7, No.2-3, pp. 97-114.
- Heeks, R. (2006) *Implementing and Managing eGovernment: An International Text*, London: Sage.

Holzer, M. and S.-T. Kim (2003). *Digital Governance in Municipalities Worldwide - An Assessment of Municipal Web Sites throughout the World*, Report, State University of New Jersey, Campus at Newark and Sungkyunkwan University.

Heeks, Richard (2001), "Reinventing Government in the Information Age : International Practice In IT-enabled Public Sector Reform", Routledge.

Haroon Shahzad, Waqas younus Sandhu (2007), *E-service in Pakistan*, Lulea university of technology, Master's thesis, Department of business administration and social sciences.

Holowczak, D. R., et al, (2001), 'Customized Geospatial Workflows for E-Government Services', GIS'OI, November 9-10.2001, Atlanta, Georgia, USA.
<http://www.webnauts.net/usability.html> on November 2010.
<http://www.useit.com/alertbox/20030825.html>

Information and Communication Technology (ICT) Status, issues and future development plans of Bangladesh by dr. Md. Omar Faruque Khan Secretary in Charge Ministry of Science and Information & Communication Technology Government of People's Republic of Bangladesh. (F)

Jaeger, P. T., Thompson, K. M. (2004). Social information behavior and the democratic process: Information poverty, normative behavior, and electronic government in the United States. *Library & Information Science Research*, Vol. 26(1), 94-107.

Lieber, A.(2000), "E-Government initiatives meeting", available at: ostiwebmaster@osti.gov

Leedy, P., and Ormrod, J., (2001), 'Practical Research Planning and Design', 8th Edition

McLean, M. & J, Tawfik., (2003), 'The role of Information and Communication Technology in the modernization of e-Government', PP 237-245

Nagesh Kumar and Alka Chadha, "Exploiting the Potential of Information and Communication Technologies for Development in South Asia," *South Asian Survey*.

Nielsen, J. Ten Usability Heuristics. Available on http://www.useit.com/papers/heuristics/heuristic_list.html

Nielsen, J., *Designing WEB Usability: The Practice of Simplicity*. New Riders Publishing, 2000.

Powell, A. (2000). *Web Design: The Complete Reference*. Berkeley: CA, USA

Richard Heeks, "Understanding e-Governance for Development," *Information Technology in Developing Countries*, 2001.

Rose, J. Democracy Squared, Designing On-Line Political Communities to Accommodate Conflicting Interests, *Scandinavian Journal of Information Systems*, 2005.

Röstlinger, A., Cronholm, S. Design Criteria for Public e-Services. In: proceedings of the 17th European Conference on Information Systems (ECIS). June 8-10, Verona, Italy. (2009)

Reynolds, M. M. and Regio, M., (2004), 'The Purpose of Transforming Government: A White Paper from Microsoft E-Government Initiatives' available on: <http://www.netcaucus.org/books/egov2001/pdf/EGovIntr.pdf> on November 2010.

Schuppan, T. (2009). "E-government in developing countries: Experiences from sub-Saharan Africa", *Government Information Quarterly* vol. 26, no.1, pp. 118-127.

Seddon, P., IT Evaluation Revisited: Plus !a Change, In: proceedings of Eight European Conference on Information Technology (ECITE). Oxford, United Kingdom. (2001)

Stanford Borins, "On the Frontiers of Electronic Governance: A Report on the United States and Canada," *International Review of Administrative Sciences* 68:2 (June 2002):200.

Saanan, Y.A., Sol, H.G., Verbraeck, A. (1999), "Snapshots of e-commerce's opportunities and threats", *Electronic Markets*, Vol. 9 No.3, pp.181-9.

Scott, M., Golden, W., and Hughes, M., (2005), 'The Implementation Of Citizen-Centered e-Government: A Stakeholder Viewpoint' accessed at: <http://www.nuigalway.ie/cisc/papers/0010ciscwp.pdf> on June 8th

Status, issues and future development plans of Bangladesh by Dr. Md. Omar Faruque Khan, Secretary in Charge, Ministry of Science and Information & Communication Technology. Study of e Government in Bangladesh Conducted by Bangladesh Enterprise Institute, April 2004

Simplified delivery of services to Citizens, EXECUTIVE OFFICE OF THE PRESIDENT OFFICE OF MANAGEMENT AND BUDGET WASHINGTON, D.C. 20503, accessed on http://www.usa.gov/Topics/Includes/Reference/egov_strategy.pdf

Melitski, J., Holzer, M., Kim, S., Kim, C. & Rho, S. (2005). "Digital government worldwide: An e-government assessment of municipal web sites", *International Journal of Electronic Government Research*, vol. 1, no. 1, pp. 1-19.

Ministry of Science and Information & Communication Technology (MIST), Status, issues and future development plans of Bangladesh by Dr. Md. Omar Faruque Khan, Secretary in Charge.

Turban, E., King, D., Lee, J., Warkentin, M., Chung, H.M. (2002), *Electronic Commerce 2002: A Managerial Perspective*, Prentice-Hall, Englewood Cliffs, NJ, UN Global E-government Readiness Report, From e-Government to Connected Governance, 2008.

Trost, Jan (1997): *Kvalitativa intervjuer*. Lund: Studentlitteratur (Text in Swedish)

UNDPEPA/ASPA, Benchmarking E-government Wood, F. et al. A Practival Approach to e-Government Web Evaluation. IEEE Computer Society. p. 22-28. 2003.

www.thedailystar.net accessed on Tuesday, November 09, 2010 focus: Public

www.thedailystar.net Source Date: Tuesday, November 09, 2010 Focus: Electronic and Mobile

Government Country: Bangladesh Created: Nov 11, 2010

Yin, R.K., (1981), 'The Case Study as a Serious Research Strategy. Knowledge 3', pp. 97-114

Yin, R. K., (1994), 'Case Study Research, Design and Methods. Thousand Oaks', 'CA: Sage Publications'

Yin R.K. (2003), 'Case study research: Design and Methods', Third edition, Sage publications, Inc.

Appendix A

Example of Checklist (A.C.B. Garcia, C. Maciel, and F.B. Pinto)

Options (2)-always, (1) - sometimes (0) - never\not applicable

Components	Sub-items	Indicate option
Visibility of system status	Gives feedback information to user depending on user location.	
	Keeps user informed regarding processing progress.	
Match between system and real world	Uses metaphors common to citizen's real world.	
	Other:	
User control and freedom	Guides user to non-existing links.	
	Requests user confirmation of relevant actions before executing these...	
Consistency and standards	Uses and information hierarchy pattern, creating specific pages for each specific navigation level.	
	Standardizes scheme for colors, fonts, links, including e-gov sites.	
Error prevention	Informs which fields are mandatory and how each field should be filled out.	
	Calls the users attention when field completion is incorrect.	
Recognition rather than recall	Relevant or commonly sought information is highlighted in the site.	
Flexibility and efficiency of use	Offers shortcuts so those more experienced users can access information with fewer clicks.	
	Personalizes pages of suit different citizen profiles.	
Aesthetics and minimalist design	Information is provided in progressive detail levels.	
	Avoids scrolling.	
Help users recognize, diagnose, and recover from errors.	When filling out forms, the sites informs the user what is causing the error and instructs on how to correct it.	
	In case of failure, previously input items can be rescued.	
Help and documentation	Offers help tool.	
	Offers personal help resources online and in real time.	
Accessibility	Allows visual perception through text markers.	
	Site compliance with W3C recommendations.	
Interoperability	Offers documents under patterns xml, swx, rft, pdf, txt, htm, or html.	
	Foresees gradual substitution of "login/password" for access (preferentially for intelligent cards).	
Security and privacy	Uses digital certification.	
	Uses virtual keyboard for password input.	
Service Agility	Offers other contact means besides internet.	
	User request are compiled within due time.	
Information truth and precision	When necessary, informs last update of each page.	
	When necessary, informs date of each displayed content.	
Transparency	It monitors the budgetary execution.	
	Renders public account to citizens.	

Appendix B

Survey questionnaires

The study is being conducted for academic purposes only. The purpose is to study the citizen's perspective and what more they want from the Local Government in the meaning of e-Government e-services.

Part- 1: General Information of Respondents

The study is being conducted for academic purposes only. The purpose is to study the factors of consumer online purchasing and regarding their various satisfaction issues.

1. **Name:**
2. **E-mail:**
3. **Gender:**
 Male Female
4. **Occupation:**
5. **Age:**
 20-25 26-30 31-35 36-40 41-45 Above 45
6. **How often do you use Internet?**
 Daily Weekly Monthly Never
7. **How often do you use any e-services provided by the Government?**
 Daily Weekly Monthly Never
8. **Which of the following service(s) do you use most frequently?**
 NBR BRTA Education above all
 Others _____

Note:

- a. If you select **NRB** (<http://www.nbr-bd.org/>) then please answer questions **part2**
 - b. If you select **BRTA** (<http://www.brta.gov.bd/>) then please answer questions **part3**
 - c. If you select **MoE** (<http://www.moedu.gov.bd/>) then please answer questions **part4**
 - d. If you select "Above all" then please answer questions **part2, part3 and part4**
- Part- 2: for NRB** (<http://www.nbr-bd.org/>)

9. Information at this website is well organized
 Yes No
10. The website is simple to use
 Yes No
11. It is easy to get in contact with the authority
 Yes No

12. Do you get all kind of information which you wanted?

Yes No

13. If the ans. Of question 12 is “NO”, please specify what kind of information do you want from that services?

14. Do you think that, there is some irrelevant information on that service? Please write in our own words what are those.

15. According to your usage or from your point of view what more features you want in order to get desired information?

16. Do you think that, the service that you used needs to be more interactive or automated? i.e. you can fill up the forms online and can send them at once and also get acknowledgement of receiving application so that you can save your time and money?

Yes No

17. Should the Government of Bangladesh implement more e-services for citizen?

Yes No

18. If your answer is “YES” of question 16 please write down the name of those e-services that you want in near future.

19. Are you satisfied by using that service?

- Completely Satisfied Satisfied
 partly Satisfied Disagree Strongly disagree

20. Other comments or feedback you want to give

Part- 3: for BRTA (<http://www.brta.gov.bd/>)

1. Information at this website is well organized

- Yes No

2. The website is simple to use

- Yes No

3. It is easy to get in contact with the authority

- Yes No

4. Do you get all kind of information which you wanted?

- Yes No

5. If the ans. Of question 12 is “NO”, please specify what kind of information do you want from that services?

6. Do you think that, there is some irrelevant information on that service? Please write in our own words what are those.

7. According to your usage or from your point of view what more features you want in order to get desired information?

8. Do you think that, the service that you used needs to be more interactive or automated? i.e. you can fill up the forms online and can send them at once and also get acknowledgement of receiving application so that you can save your time and money?

Yes No

9. Should the Government of Bangladesh implement more e-services for citizen?

Yes No

10. If your answer is “YES” of question 16 please write down the name of those e-services that you want in near future.

11. Are you satisfied by using that service?

Completely Satisfied Satisfied
 partly Satisfied Disagree Strongly disagree

12. Other comments or feedback you want to give

Part- 4: for MoE (<http://www.moedu.gov.bd/>)

1. Information at this website is well organized

Yes No

2. The website is simple to use

Yes No

3. It is easy to get in contact with the authority

Yes No

4. **Do you get all kind of information which you wanted?**

Yes No

5. **If the ans. Of question 12 is “NO”, please specify what kind of information do you want from that services?**

6. **Do you think that, there is some irrelevant information on that service? Please write in our own words what are those.**

7. **According to your usage or from your point of view what more features you want in order to get desired information?**

8. Do you think that, the service that you used needs to be more interactive or automated? i.e. you can fill up the forms online and can send them at once and also get acknowledgement of receiving application so that you can save your time and money?

- Yes No

9. Should the Government of Bangladesh implement more e-services for citizen?

- Yes No

10. If your answer is “YES” of question 16 please write down the name of those e-services that you want in near future.

11. Are you satisfied by using that service?

- Completely Satisfied Satisfied
 partly Satisfied Disagree Strongly disagree

12. Other comments or feedback you want to give

Thanks for your Kind passion and valuable time

University of Borås is a modern university in the city center. We give courses in business administration and informatics, library and information science, fashion and textiles, behavioral sciences and teacher education, engineering and health sciences.

In the **School of Business and Informatics (IDA)**, we have focused on the students' future needs. Therefore we have created programs in which employability is a key word. Subject integration and contextualization are other important concepts. The department has a closeness, both between students and teachers as well as between industry and education.

Our **courses in business administration** give students the opportunity to learn more about different businesses and governments and how governance and organization of these activities take place. They may also learn about society development and organizations' adaptation to the outside world. They have the opportunity to improve their ability to analyze, develop and control activities, whether they want to engage in auditing, management or marketing.

Among our **IT courses**, there's always something for those who want to design the future of IT-based communications, analyze the needs and demands on organizations' information to design their content structures, integrating IT and business development, developing their ability to analyze and design business processes or focus on programming and development of good use of IT in enterprises and organizations.

The **research** in the school is well recognized and oriented towards professionalism as well as design and development. The overall research profile is Business-IT-Services which combine knowledge and skills in informatics as well as in business administration. The research is profession-oriented, which is reflected in the research, in many cases conducted on action research-based grounds, with businesses and government organizations at local, national and international arenas. The research design and professional orientation is manifested also in InnovationLab, which is the department's and university's unit for research-supporting system development.



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